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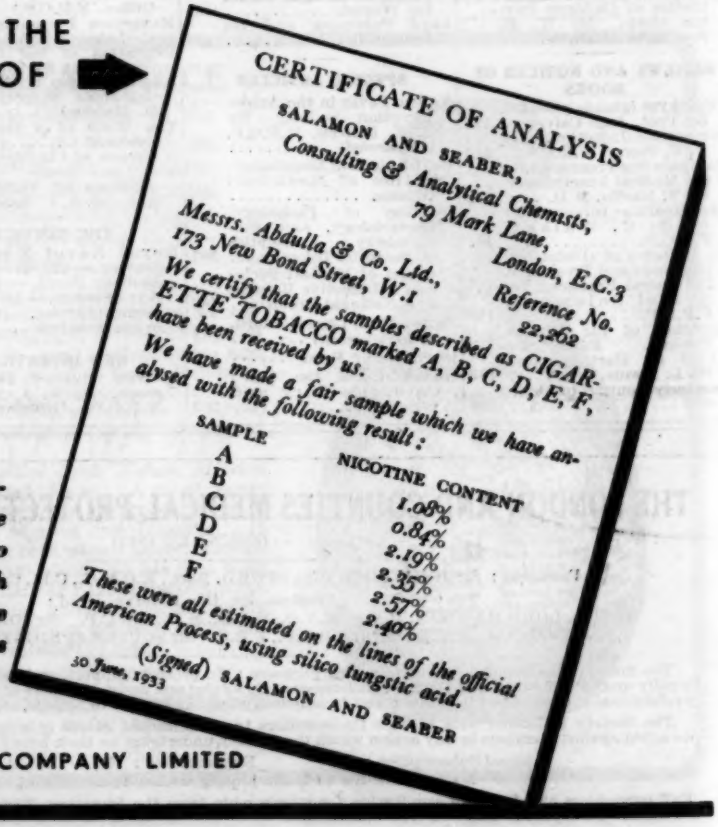

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ADDRESSES AND ORIGINAL ARTICLES

DISTURBANCES OF THE BODY TEMPERATURE*

BY C. E. LAKIN, M.D., F.R.C.P. Lond., F.R.C.S. Eng.
PHYSICIAN TO THE MIDDLESEX HOSPITAL AND THE LONDON FEVER HOSPITAL

EXACTLY 160 years ago Joseph Priestley by concentrating the sun's rays upon a red compound of mercury by means of a burning glass liberated a gas which he called Dephlogisticated Air, or oxygen as we now know it. How little did his friend, Samuel Parker, the London optician, who made and gave him this glass, a foot in diameter, divine the untold development of knowledge which would result from this simple gift!

Combustion and Heat Production: Some Elementary Considerations

When a candle burns in an enclosed space occupied by air the air loses some of its oxygen, becomes richer in water vapour and carbon dioxide, and also becomes hotter. This latter fact is simply an example of the universal law that no change, chemical or physical, can take place without energy being either absorbed or liberated in the process. In the example we have chosen energy is set free in the form of light and heat. Even when iron rusts a little heat is produced, but so slowly that it is dissipated before it can heat the iron. Similarly, when we breathe in air the oxygen is taken up by the hæmoglobin of the blood and carried to the tissues where the oxygen joins with the protoplasm of the tissue cells, with the result that the heat accompanying this chemical change is sufficient to keep our bodies warm even on a cold day. To continue the comparison, the air we breathe out is warmer and more moist and contains less oxygen and more carbon dioxide than the air we breathe in. If this was all that happened the cell protoplasm would soon become deprived of its carbon, but there is a constant supply of fuel in the form of carbon compounds arriving from the alimentary tract derived from the food we eat. The large complex molecules contained in food are broken down in the process of digestion into simpler constituents which, after absorption, are built up into the protoplasm of cells where, again by a process of oxidation, they provide a constant supply of heat and energy. This cellular activity we speak of as metabolism. In states of heightened metabolism more heat is produced, while in conditions of lowered metabolism the production of heat is lessened. The functional activity of the thyroid and adrenal glands plays a further part in influencing metabolism and heat regulation. It may be said that energy is used up every time a muscular action is performed, every time the stomach digests or the brain thinks.

But the generation of heat within the body does not explain the fact of the body temperature being kept constantly at the same level. This fact presupposes that the amount of heat produced is exactly balanced by the sum total of the losses of heat which are constantly going on: at the surface of the body by conduction, radiation, and evaporation; from the lungs by evaporation of aqueous vapour and by the warming of the colder inspired air; in the intestinal canal by the warming of cold food or drink; and lastly, heat is lost by the warm dejecta leaving the body. Any disturbance of this equilibrium must be followed by an increase or a lowering of the body temperature. But there is another factor without which the maintenance of this equilibrium and the equable distribution of heat throughout the body would be impossible and that is the circulation of the blood. By means of this a regulation of the loss of heat may be brought about whenever necessary, the blood-supply to the skin varying as the arterioles dilate or contract under the influence of the vasomotor nerves. Whenever the external temperature would bring about too considerable a loss of heat, the peripheral arterioles contract and the circulation becomes slower and heat is thereby retained in the body; sometimes, as in shivering, the muscles are stimulated to increased action and increased production of heat results. When on the other hand the loss of heat from the surface is prevented, as occurs in a very hot room, the peripheral arterioles dilate, the heart's action accelerates, and a much greater quantity of blood flows through the skin, and the sweat glands pour forth sweat which, by its evaporation, tends to lower the temperature. At the same time the respiration is quickened and further loss of heat takes place by means of the aqueous vapour in the expired air.

Although oxidative processes are taking place in all the tissues of the body, the two chief seats of heat formation are the muscles and the glands. It has been computed that the muscles constitute more than one-half of the total weight of the soft tissues of the body, and even during rest oxidative changes are constantly occurring in them, leading to heat production and the maintenance of muscular tone. It is probable that, weight for weight, the glands are still more effective as heat producers, but they only make up about 4 per cent. of the body-weight. The liver of an adult weighs about 3 lb., and is in constant action even when digestion is not in progress. The kidneys, weighing 5 oz. each, are also in a state of constant activity, and it is said that the urine leaving them is warmer than the blood in the aorta. According to Pembrey,

> "an adult man produces about 1,700 calories in twenty-four hours when he is fasting and remains perfectly quiet in bed. The sources of this heat have been calculated. The heart during its work produces about 70 calories, and the respiratory muscles about 150 calories; the heat due to the activity of the liver and kidneys has been estimated by Tigerstedt at 368 and 74 calories respectively. The sum of these is 662 calories, so that there remains a balance of about 1,000 calories, which must be formed almost entirely in the skeletal muscles. The minimum production of heat in twenty-four hours by a man weighing 70 kilogrammes (11 stone) may be estimated at 1,200 calories arising from the muscles and 500 calories from the glands."[1]

It has also been computed that in a man doing a moderate amount of daily work about one-twentieth of his metabolic energy leaves the body as mechanical energy, the rest being evolved in the form of heat. Coming to the question of heat loss, it has been estimated that about 5 per cent. of the total heat loss is expended in warming the food and inspired air, about 15 per cent. in the evaporation of water and CO_2 in the respiration, and about 80 per cent. by radiation and convection and the evaporation of

* The first Lettsomian lecture for 1934, delivered before the Medical Society of London on Feb. 19th. Lectures II. and III. will appear in later issues.

[1] Text-book of General Pathology. Edited by M. S. Pembrey and J. Ritchie. 1913.

sweat from the skin (Starling). The proportion of the heat lost by the skin will increase very largely in the presence of a high external temperature or of an excessive heat production in consequence of violent muscular exercise.

It is clear that the various processes responsible for the production of heat such as muscular and glandular activity, as well as those concerned with the loss of heat such as vascular dilatation, are all under nervous control. There is, however, great diversity of opinion as to whether special centres for the regulation of temperature exist in the brain, and we shall return later to the consideration of this subject.

Means of Measuring Temperature

Galileo is said to have been the first to utilise the principle of the expansion of bodies when subjected to heat in making measurements of temperature. The year of his invention of the thermometer is given as 1603, and it was his contemporary, Sanctorius, the celebrated Paduan professor, who applied his invention to clinical medicine. Time does not permit us to go into the history of thermometry; suffice it to say that thermometers began to make their appearance in English hospitals about 1866–67, though they had been in use in Edinburgh long before, and came into general use about 1868–70. They were about 10 inches long and, as Brunton relates, so clumsy that they were carried under the arm "as one might carry a gun." Their reduction in size—in fact the invention of the pocket thermometer—was due to Clifford Allbutt (1868). One name we cannot pass over, that of Wunderlich, professor of medicine in Leipzig from 1850 to 1877, whose classical work "On the Temperature in Diseases" was translated into English and published by the New Sydenham Society in 1871. Of Wunderlich it has been said: "He found fever a disease and left it a symptom."

The means at our disposal for registering the temperature of the body are:—

(1) The *mercury thermometer*—either in the form of the clinical thermometer as we now know it or, where surface temperature is being investigated, a mercurial thermometer of special shape in which a long cylindrical bulb coiled up in one plane at right angles to the stem is applied to the skin.

(2) The *electrical resistance thermometer*. This method depends upon the alteration of the electrical resistance of a platinum wire caused by a slight increase in its temperature. The alteration in conductivity is then measured by means of a Wheatstone's bridge or may be recorded photographically.

(3) The *thermopile*. This is based upon the principle that if the junction between two dissimilar metals be warmed a difference of electrical potential is produced and a potentiometer is used to record the current changes.

The two latter methods are employed where great accuracy is desired or a continuous record is to be made.

Two other instruments are in use where the degree of humidity of the air has to be taken into account as in cases where observations have to be made on perspiration. First, there is the wet and dry bulb thermometer, consisting of two mercurial thermometers, the bulb of one being covered with a close-fitting muslin bag which is kept moist by being held in contact with a wick dipping in water. The water evaporates from the bulb at a rate varying with the degree of saturation of the atmosphere with aqueous vapour. If the air is already saturated with moisture and no evaporation is taking place from the wet bulb both thermometers will register identical temperatures. Where the difference in the temperatures of the two thermometers is great, one may regard the air as being dry. The degree of humidity of the air can then be calculated from a formula. Valuable as this information is it does not give us a true idea of the cooling power of a particular atmosphere. It fails to register for instance cooling due to air movement. This deficiency is supplied by Leonard Hill's kata-thermometer, whereby the rate of cooling is measured directly. A special type of kata-thermometer, known as a Comfimeter, gives an immediate indication of the cooling property of air in rooms.

Normal Daily Range of Temperature

The mean daily temperature in health is usually said to be 98·4° F. when taken in the mouth. If the whole 24 hours be taken into account this is probably rather too high than too low a mean. By means of the continuous readings method of recording temperature it is found that in health the temperature of the body is highest in the evening between the hours of five and eight and lowest in the early hours of the morning. This is chiefly to be explained by the muscular activity which occurs during the day. It is questionable to what degree the increased metabolism resulting from the ingestion of food is also responsible, since a temperature curve similar to the ordinary type has been observed in fasting men. A reversal of the daily routine such as occurs in night workers leads after a few days to a reversal in the temperature curve. When night duty is first undertaken an overpowering desire for sleep is usually experienced about 4 A.M., the hour of the usual minimum. When a healthy person is kept in bed, the normal temperature variations still occur but the evening maximum is not quite so high. During sleep the temperature falls. This is to be attributed to the diminished activity of the body whereby less heat is produced and also to the relaxation of the vessels of the skin leading to increased loss of heat. It may be said that in health the range is approximately from 97° F. to 99° F. if the mouth temperature be taken. The rectal temperature is usually ½° to 1° F. higher than the temperature as taken in the mouth.

Sustained exercise leads to an increase of body temperature, the rise being proportional to the exertion made. It may be as much as 3° or 4° F. but is of temporary duration, and in health is unaccompanied by any feeling of discomfort. During exercise breathing is quickened and the pulse-rate rises and in this way the body gets rid of some of its extra heat by an increase of aqueous vapour in the expired air and by sweating. The increased temperature which occurs in spite of the increased loss of heat appears to be beneficial to the athlete in that it facilitates the dissociation of oxyhæmoglobin in the tissues, with the further result that larger amounts of CO_2 are evolved and the hydrogen-ion concentration tends to go up.

Temperature also varies with age. In infants an hour or two old the temperature may be as low as 93·2° F. It rises gradually during the first few days of life but the infant only slowly develops the power of maintaining a constant body temperature, and its temperature falls as soon as it is exposed to a moderate degree of cold. Heat regulation being imperfect, a rise or fall of the body temperature in the case of an infant is of less clinical significance than a similar change in the temperature of an adult. A fit of screaming may cause a rise of several degrees, a fact which may cause concern if this imperfection of heat regulation is not appreciated. It has been found that too cold a bath or exposure to cold after

a warm bath may lower the temperature of a healthy infant from 7° to 9° F. In old age the temperature is usually subnormal. Metabolism is much less active and the power of heat regulation becomes enfeebled, so that old people are much more affected by extremes of weather.

When we consider the temperature of the surface of the body it is found that in health it varies in different parts. The temperature of the skin of the trunk is much more constant and uniform than that of the extremities. Absence of uniformity is a sign of vigour and conversely a uniform surface temperature in all parts is a sign of poor health.

In concluding this section I should like to quote from Pembrey's article (loc. cit.) on the Physiology and Pathology of Temperature, to which I am much indebted. He says:

"There is no uniformity in the temperature of the healthy body; the temperature is not constant in health, notwithstanding the fact that it is often said to be so and clinical thermometers and temperature charts are marked with a line at 98·4° F. for the normal. The absence of uniformity is a sign of health and well-being. We are comfortable and unconscious of the fact that there are local differences of temperature, which at once becomes manifest when we place our hands in succession on the face, chest, abdomen, and foot. As soon as the external conditions, such as heat, moisture and absence of wind, become favourable for the development of a more uniform temperature of the body, discomfort and inefficiency arise. This question is one of the greatest importance in relation to the influence of climate and artificial systems of heating dwellings and work-rooms, and it is unfortunate that many authorities have overlooked the physiological aspect. In living things there is no uniformity, and all attempts to obtain uniformity in religion, politics, work, or social standing, have failed. Uniformity would mean absolute stagnation—death.

"The extravagant and dusty open fire is better than the closed stove or the radiators filled with hot water or steam, for it produces more variations in the temperature of the room and these act upon the skin. Changes in the temperature of the skin stimulate the nervous system, and produce a more steady growth and greater activity of the body and mind."

Pyrexia: Hyperthermia: Aseptic Fever

Before proceeding further it may be well to define the sense in which the words pyrexia, hyperthermia, and fever are used in these lectures. *Pyrexia* is used in the sense of a heightened body temperature. *Hyperthermia* signifies a high temperature produced by causes other than infection, such as, for instance, is seen in heat-stroke or pontine hæmorrhage, or after the injection of drugs such as β-tetrahydronaphthylamine. The last example will in due course be considered under the heading of aseptic fever. The term *Fever* is used in the sense of a complex response of the body to infection in which pyrexia or raised temperature is but one of the manifestations. It is essentially a response in metabolism associated with a toxic disturbance of heat regulation, and it will be shown to be due to an exaggeration of the processes by which the body normally responds to conditions which otherwise tend to lower the body temperature. Before entering upon a consideration of the underlying processes responsible for fever it will be convenient to give some attention to the subject of hyperthermia such as is exemplified in heat-stroke.

HEAT-STROKE AND SUN-STROKE

Divergent opinions have been held as to what happens in death from exposure to the sun. Some have held that this condition is not due primarily to the heat of the sun but rather to its actinic rays, maintaining that a distinction should be drawn between heat-stroke and sun-stroke. Experiments upon soldiers whose clothing was specially designed to prevent penetration of the actinic rays of the sun have disposed finally, I think, of this theory of "sun-stroke" in the strict sense of the term (Jour. Roy. Army Med. Corps, 1911, xvi., 109). That sun-stroke is a fever endemic in certain hot countries and due to a specific micro-organism is another view for which there is no convincing evidence. In some instances it would appear that cases of specific fevers have been mistaken for heat-stroke and conversely some cases of heat-stroke have been erroneously diagnosed as specific fevers. Accumulated evidence points to the fact that sun-stroke is really heat-stroke, and is a disorder of the heat-regulating processes of the body produced by the action of moist heat upon men who are working hard or fatigued and often unsuitably clothed. We have seen that even under favourable conditions muscular work may lead to a rise of temperature to 101° F. or 102° F. Where a man is exposed to a higher external temperature than the body temperature when the air is unduly moist, and especially if it is also stagnant, it becomes difficult for him to regulate his temperature by sweating. It is true that in some cases where he is unsuitably clothed loss of water from the skin has been so great that, before unconsciousness occurs, the clothing is wet with sweat, yet where evaporation from these is slow on account of high atmospheric humidity the body will not be cooled.

We know that the chemical or metabolic processes in the living organism are less active when the body temperature falls below a certain optimum, and that with increasing body temperature these processes are speeded up; in this way with increasing body temperature the production of heat is further increased, and in the case we are considering a vicious circle becomes established. The heat-regulating mechanism of the body is overwhelmed and death will occur unless the temperature be lowered. A temperature of 107·6° F. maintained for some time will coagulate the globulin of the cells, a factor which plays a part in determining death in these circumstances. A writer has well said:

"Soldiers have been especially liable to 'heat stroke' and many lives have been lost during forced marches, when the air was hot, moist and stagnant. The conditions under which soldiers work are the most favourable for the production of heat stroke; they are unsuitably clothed, heavily laden, and march in such close order that they are surrounded by air saturated with moisture from the sweat and breath of their comrades. They march under orders, and are not free to obey the dictates of their own sensations; moreover, their pride will often make them persist in their efforts to keep up with their more efficient comrades until they fall out of the ranks and become unconscious." (Pembrey.)

The onset of heat-stroke may occur with catastrophic suddenness and death be almost instantaneous, or there may be premonitory headache, nausea, dizziness, and visual disturbance. In a case that was admitted to the Middlesex Hospital the temperature rose to 109° F., the breathing was deep and the pupils dilated, the man being quite unconscious. As he grew worse the pulse became irregular, rapid, and more feeble, the breathing more shallow and of the Cheyne-Stokes type, and he died within a few hours of admission in spite of the most active antipyretic treatment.

There are other cases spoken of as "heat exhaustion," in which the skin is bathed with sweat, the body temperature raised though much less so than in the form just considered but in which the

patient is in a condition of profound collapse. There is rarely loss of consciousness. In such cases the failure of regulation appears to be due to a weak heart and defective vasomotor control. It is difficult to determine whether the weakness of the heart is the cause or the effect of the failure to regulate the temperature, it being a well-established fact that persons with weak or diseased hearts fall easy victims to heat-stroke, while on the other hand the heart is readily injured by a high temperature and a defective supply of blood. There is usually no difficulty in distinguishing clinically between heat-stroke and heat exhaustion, but there is no clear line of demarcation between the two conditions and cases of heat exhaustion may pass on to heat-stroke. In the one condition the heat-regulating mechanism is embarrassed, in the other it is overwhelmed.

There is another condition to which passing reference may be made, known as "heat cramps," met with more especially in stokers, miners, steel-workers, and others exposed to intense heat. Cronin in 1892 was one of the first to study this condition. Spasms of sudden onset affecting successive groups of muscles of the limbs or of the abdominal wall occur intermittently over a period of 24 hours or so. They are usually attributed to the loss of blood chlorides, the loss amounting in some cases to as much as 20 g. in the 24 hours. This loss of chlorides is believed by some to be a diffusion effect of taking large quantities of water. Others, in view of the prompt benefit which results from the intravenous injection of sodium bicarbonate, regard the condition as being due to an increase in the blood of toxic elements brought about by profuse perspiration. Heat cramps may be prevented by supplying men exposed to great heat with salinized water containing from 0·25 to 1 per cent. of sodium chloride cooled to about 50° F., and salt tablets are commonly dispensed in industrial works where high conditions of temperature prevail. Cases are usually treated with saline fluids, warm baths, and rest.

I have known death to occur while a patient suffering from renal dropsy was having a hot-air bath. Such deaths appear to be due to heat-stroke. If sweating fails to take place the temperature of such a patient rapidly rises. A nurse in charge of such a patient should be told to take the temperature of the person subjected to such treatment every two minutes till sweating occurs. If no beads of sweat are seen and the temperature progressively rises the bath must be brought to an end without further delay. In a healthy person the secretion of sweat commences as soon as the temperature of the body has attained a height of 0·2° to 0·5° C., that is roughly ½°–1° F. above the normal.

In guarding against sun-stroke it is necessary to wear light loose clothing to favour the evaporation of sweat, and a good supply of drinking water must be available. On a march frequent halts must be called. The most successful treatment of sun-stroke is the internal and external application of cold water and, if available, ice. Cooling the head and effusions of cold water to the neck so that the temperature of the blood in the carotid arteries may be affected is often followed by improvement. In severe cases ice water enemata are called for, as where the circulation is depressed the application of cold to the surface may fail to be transmitted through the feebly circulating blood to the internal parts of the body. Even in cases of recovery from heat-stroke abnormal nervous symptoms may occur for years after the stroke whenever the external temperature of the air rises above a certain point.

We have seen that sun-stroke is due to inability of the body to lose heat by sweating, and before leaving the subject of heat-stroke, an experiment of Leonard Hill's is so illuminating in this connexion that it must be quoted.

A number of healthy young men were crowded into an airtight compartment provided with necessary apparatus for sampling the air for analysis. After 44 minutes the dry bulb thermometer registered 87° F. and the wet bulb 83° F.; the CO_2 had risen from 0·04 per cent. to 5·26 per cent., while the oxygen had fallen from 21 per cent. to 15·1 per cent. Great discomfort was experienced and the skin of all was flushed and drenched with sweat. The talking and laughing of the occupants had gradually become less and finally ceased. Long before the discomfort had become extreme the oxygen percentage became so low that matches would not burn, yet the disinclination to smoke cigarettes was not noticed till some time after it was impossible to light them. On whirling the air in the chamber by means of an electric fan immediate and great relief was felt in spite of the fact that the temperature continued to rise. On turning off the fans the discomfort returned and the occupants cried out for the fans to be restarted. Hill then allowed the occupants of the compartment to breathe fresh air through tubes provided with mouthpieces piercing the walls of the chamber, but they received practically no benefit from the fresh air. The starting of the fans, however, brought relief as before. Persons outside the chamber whose bodies were cool then breathed in the vitiated air from the compartment. No discomfort was experienced, nor did they suffer from headache or any of the effects popularly supposed to be due to inspiring vitiated air.

It is clear, from this experiment, that neither the lack of oxygen nor the presence of a high percentage of CO_2 or other excreted substance has any influence on the "badness" of the air of a room. Discomfort is due to the loading up of the air with moisture, making it impossible for the occupants to lose sufficient water from the skin.

PERSPIRATION AND SWEATING

Reference may here be made to the distinction which can be drawn between perspiration and sweating. By perspiration, or insensible perspiration as it is called, is meant the escape of water vapour by osmosis through the skin. It is thought that the sweat glands play no part at all in this process. The amount escaping will be proportional to the heat production of the body and to the external temperature, will be greater when the air is dry and less if the air be stagnant. It is diminished in places where the skin contains much fat and is not greatly influenced by alterations in the amount of fluid drunk. If the body be enclosed in a vessel through which a regulated current of air is passed and the temperature of the air be gradually raised it is found that the amount of water given off from the skin rises slowly up to a certain point and then suddenly mounts rapidly. This sudden increase is due to a new process coming into play—namely, the activity of the sweat glands. Beads of sweat appear and there is a great increase in the discharge of CO_2 from the skin. Prof. Kuno of the Manchurian School of Medicine has shown that, except in the case of the palms and soles, the sweat glands of the body are almost entirely concerned with the regulation of the body temperature. He has shown by means of absorbent paper that sweating is not uniform in different parts of the body.

Curiously enough, the palms and soles, where the sweat glands are most closely crowded, respond little if at all when the temperature of the body is raised; profuse sweating in these parts occurs in response to any intense sensory stimulation and in states of mental stress. Kuno has shown that the

head, neck, dorsal and ventral aspects of the upper part of the body sweat most, while the axillæ and femoral regions participate to a slighter degree. Thus it will be seen that sweating principally occurs in those parts which by reason of their being more exposed in a hot climate offer the best opportunity for evaporation to occur. Those parts of the skin in which there is little chance of evaporation sweat least—namely, the armpit, perineal region, inguinal and femoral regions. This seems contrary to our usual experience, because those parts of the body are very likely to become clammy in hot weather, but they become wet not because sweating is especially abundant but because sweat, once discharged, evaporates with difficulty.

Under normal circumstances in temperate climates the greater part of the water imbibed in the course of the day is excreted by the kidneys, a smaller portion leaving by the lungs and by the surface of the skin in the form of insensible perspiration. The amount of water lost by the lungs and by the skin is about equal and varies with the metabolism of the individual and with the temperature and humidity of the air. Benedict estimates that in the case of a man with a basal metabolism of 1700 calories 430 g. (roughly 15 ounces) are lost by the lungs and a like quantity from the skin in the form of insensible perspiration in 24 hours. The sweat is the most dilute of all the body fluids and contains 99 per cent. of water. It is, of course, hypotonic as compared with plasma, and this contributes to its efficacy as a cooling medium, since the more dilute a solution the higher is its vapour pressure and consequently the more rapid its rate of evaporation. Of its solid constituents about three-quarters consist of sodium chloride and about half the rest of urea. In cases of renal insufficiency sweat becomes more concentrated and it is said that its urea content is increased. The secretion of sweat is under the control of the sympathetic nervous system, and may be induced by warming the arterial blood flowing to the brain in the carotid arteries even when the temperature of the body is otherwise unchanged. Though usually associated with an increased blood flow in the skin capillaries sweating is not dependent upon this, for stimulation of the sciatic nerve results in sweating in the leg in spite of the fact that vasoconstriction is also produced. Moreover, the perspiration of syncope, fear, and death is associated with pallor of the skin (Bayliss).

ASEPTIC FEVER

This term has been employed to denote the pyrexia which results when certain chemical substances are introduced into the body either by ingestion or injection. Among such substances may be mentioned β-tetrahydronaphthylamine, dinitro-o-cresol (the drug recently introduced for the treatment of obesity), atropine, cocaine, caffeine, and the injection intravenously of very strong sugar solutions. Another form of what may be termed aseptic fever is sometimes seen in prolonged thyroid feeding. If a few milligrammes of β-tetrahydronaphthylamine (which we may abbreviate to T.H.N.) be injected into an unanæsthetised rabbit (Elliott: Jour. of Physiol, 1912, xliv., 374) and the animal be examined after the lapse of half an hour, its temperature is found to have risen, respiration is panting and rapid, there is protrusion of the eyes and dilatation of the pupils. There is erection of its fur accompanied by intense constriction of the arterioles of the skin, readily observed in the ears, which feel cold to the touch. The pyrexia and the changes in the vascularity of the skin produced by the injection of T.H.N. have been compared to the changes taking place during the rigor state of an attack of malaria, and further reference will be made to this form of aseptic fever when we enter upon a consideration of the processes underlying fever. Prolonged thyroid feeding produces an entirely different type of pyrexia, not very unlike the so-called hectic type encountered in tuberculous infections. Experimental pyrexia cannot be produced in a warm-blooded animal if the spinal cord be divided in the cervical region or the mid-brain removed.

THE TEST-MEAL IN THE DIAGNOSIS OF GASTRIC DISEASE

BY N. F. MACLAGAN, M.B., M.Sc., M.R.C.P. Lond.
WHOLE-TIME WORKER FOR THE MEDICAL RESEARCH COUNCIL
(*From the Courtauld Institute of Biochemistry, Middlesex Hospital, London*)

THERE is at present no general agreement on either of the two principal questions which may be asked about test-meals—namely, what is the best form of test-meal to use and what information of diagnostic value may be obtained by its use. Much has recently been written by Bloomfield and Polland [1] in favour of the histamine test, but while one may agree with its theoretical advantages it appears that from a clinical standpoint the final decision should rest upon proved utility rather than upon these. If any other form of test-meal can be shown to be of more service in distinguishing a benign from a malignant gastric lesion, that one should be used in preference. We may, however, anticipate the results of this analysis to the extent of saying that the histamine test compares very favourably with its rivals in this respect.

The present paper gives the results of an attempt to compare the different types of test-meal now in use, and to assess the value of each, on the basis of some of the statistics which have recently been published. The Ewald (one hour) meal and the histamine test appear to be most popular in America, and the Rehfuss type of fractional test-meal in England. Reports on large series of patients are available on each of these, but many do not give the figures necessary to this type of analysis, so that only one suitable series for each type could be found. It is particularly unfortunate that the results recently reported from the Mayo Clinic by Vanzant et al.[2] do not contain full details of the cases. While their data for normal persons are admirably tabulated they have omitted the actual means and standard deviations of the pathological ones, so that although their method is well adapted to the demonstration of changes of acidity in disease it does not permit a critical inquiry into the diagnostic value of the Ewald meal. It appears, however, that they do not claim very much in this direction (see Comfort and Vanzant [3]).

THE DATA TO BE OBTAINED

The total information which may be obtained from a test-meal may be considered under four heads.

(1) *Examination of the resting juice.*—The value of this procedure is too well known to require emphasis here. Its value in the diagnosis of gastric carcinoma has been stressed particularly by Bennett,[4] and it is sufficient to say that most physicians, at least in this country, would consider it an essential

part of the test. In the fractional and histamine tests the resting juice is first removed, and although this examination can easily be combined with the Ewald meal, as suggested by Harrison,[5] this is apparently not the practice in America.

(2) *Emptying time, or volume of residue.*—The histamine test alone fails to give any information on this point. It is questionable whether this is a serious criticism, for the motility of the stomach under the conditions of the test-meal is well known to be extremely variable (Bloomfield and Keefer [6]) so that minor alterations are of doubtful importance. Most of the cases of early pyloric stenosis which can be detected in this way will show the presence of charcoal in the resting juice or will be demonstrated by X rays.

(3) *Presence of blood in the test-meal.*—Traces of blood are a normal finding in the histamine test, and although of greater significance in the fractional test are easily produced by trauma. Gross hæmorrhage will be detected by any test.

(4) *Height of acidity reached.*—Most recent publications have been concerned with this point almost exclusively, and sufficient figures have now been published to warrant a first attempt at comparing the three methods in this respect.

Degree of Acidity and Deductions to be Drawn from it

The basis of this branch of test-meal diagnosis rests upon the association of hyper-acidity with peptic ulcer, and of hypo-acidity with gastric cancer. These associations appear to be best explained by the theory of Hurst,[7] who postulates the existence of a "hypersthenic gastric diathesis" prone to peptic ulcer, and a "hyposthenic gastric diathesis" prone to gastric cancer,* but an alternative explanation of the frequency of hyper-acidity in peptic ulcer is concerned with the theory of duodenal regurgitation (Boldyreff,[8] Bolton and Goodhart [9]). This is a much disputed point which I have discussed elsewhere,[10] but it need not be considered here as it will not affect the subsequent arguments.

(*a*) *Demonstration of achlorhydria.*—The significance of achlorhydria varies with the type of test-meal, but there is now almost general agreement that histamine should be used if the demonstration of achlorhydria, or the presence of Castle's intrinsic factor, is the principal object of the examination. This is both because pure undiluted gastric juice can only be obtained in this way, and because histamine is the most powerful stimulant of gastric secretion, so that many persons who fail to secrete hydrochloric acid with gruel or alcohol produce average amounts with histamine.

(*b*) *Significance of different levels of acidity.*—It is generally agreed that absolute indications are rarely forthcoming, but that the matter resolves itself into one of relative frequencies. I am not, however, aware of any previous attempt to express these frequencies in numerical terms or to compare the usefulness of different test-meals in this way. Certainly the existing data are all too scanty to permit any very great accuracy in these calculations, but they may nevertheless give comparative results, and may serve to show where further observations are likely to be of value.

One of the greatest difficulties, the lack of satisfactory normal standards, has only very recently been removed by the work of Vanzant et al.[11] on the Ewald meal, and by Polland [12] on the histamine test. Corresponding standards for the fractional test-meal are deficient, being confined to the pioneer work of Bennett and Ryle,[13] Baird, Campbell, and Hern,[14] and Apperly and Semmens.[15] These refer to healthy medical students, mostly male and within a limited age-period, so that they are not of general application.

We may now take two representative cases as a basis for discussion.

CASE A.—The patient exhibits certain symptoms and signs thought to originate in the stomach, and his test-meal shows a certain level of acidity. What is the chance of his having (i) a peptic ulcer and (ii) a peptic ulcer or a gastric carcinoma?

The mental choice between (i) and (ii) will be largely a matter of age and clinical history. It is not an unimportant choice, for we shall see that while the test-meal may occasionally help in (i) it can never do so in (ii). There may be those who will consider these points too obvious to require mention, but let them reflect upon the large numbers of "routine" tests which are still performed in many general hospitals upon doubtful cases of dyspepsia. It happens not infrequently that the radiological examination is postponed, perhaps for reasons of economy, and a test-meal is substituted, so that it may be of some interest to calculate the chances of gaining useful information in this way.

Now the answer to these two questions obviously depends upon the following: the frequency of ulcer (x %) and of cancer (y %) in the population from which the patient was drawn; the frequency of his particular level of acidity in persons with ulcer (u %), with cancer (c %), and without ulcer (e %), and without cancer (f %). Since in the general population the incidence of ulcer or cancer is not large, we may without serious error take $e=f=n=$ % of normal persons having the required level of acidity. In certain cases this is not accurately known, and we shall have to take instead average figures from a large number of abnormal persons, excluding as far as possible cases of ulcer and cancer.

It is now easy to show that the patient's probability of having ulcer is

$$\frac{ux}{ux+n(100-x)},$$

and his probability of having either ulcer or cancer is:

$$\frac{ux+cy}{ux+cy+n(100-x-y)}.$$

Since we are in doubt as to the diagnosis, we may interpret this as meaning that the patient in (i) has a 50 per cent. chance of having a normal stomach, so that $x=50=100-x$, and our probability becomes:

$$\frac{u}{u+n}.$$

The patient in (ii) also has a 50 per cent. chance of normality and, say, equal chances of ulcer or cancer, so that $x=y=25$, and the probability is:

$$\frac{u-c}{u+c+2n}.$$

If gastric (g %) and duodenal ulcer (d %) are to be considered separately, we have in (i):

$$\frac{g+d}{g+d+2n}$$

and in (ii):

$$\frac{g+d+c}{g+d+c+3n}$$

as the required probabilities. The difference between these figures and 0·5, the assumed clinical probability, is a measure of the contribution of the test-meal to

* For present purposes it is immaterial whether this is an inborn condition or the result of gastritis.

the diagnosis. If we draw an arbitrary line at the 20 : 1 chance, as is usual in statistical work, we may say that useful information is obtained only if the calculated probability lies outside the limits 0·05–0·95. It must, however, be emphasised that 0 and 1 do not represent absolute certainties, being due partly to inadequate numbers and partly to imperfect statistical technique. In most cases the figures necessary for a fuller statistical treatment are not available.

CASE B.—The patient has a doubtful gastric lesion, demonstrated by X rays, and his test-meal shows a certain level of acidity. What is the chance of malignancy?

Probably no one would dispute the importance or the difficulty of such cases as this, so that an examination of the probability is of special interest. This is particularly so on account of the difficulty of deciding at operation whether an ulcer is benign or malignant. According to Stewart[16] a pre-operative diagnosis should always be aimed at. The diagnosis lies usually between gastric ulcer and gastric carcinoma, for duodenal ulcer rarely causes difficulty in radiological diagnosis. Using the same symbols and assuming a 50 per cent. chance of malignancy on clinical grounds, the probability is:

$$\frac{c}{g+c}.$$

One further calculation is concerned with the proportion of cases in which the diagnosis is likely to be helped. If, for example, 0 per cent. and 29·8 per cent. respectively of cases of peptic ulcer and normals come within the useful range of probability,

$$\frac{0}{2}+\frac{29{\cdot}8}{2}=14{\cdot}9\%$$

of our doubtful population consisting of half normals and half ulcers will be helped.

It will be noted that no mention of age or sex has been made in the above discussion. This is a necessary omission on account of the lack of data and will be referred to below. The applications of these methods to the three types of test-meal will now be considered.

THE EWALD MEAL (Table I.)

Sagal Marks and Kantor[17] gave four "Uneeda" biscuits with two glasses of water, without removing the resting juice. A single extraction was made at 45 mins. As normal standards their total figures for both sexes from ages 41–50 have been used, since they state that their percentages were almost unaffected by excluding cases of gross gastric disease.

TABLE I.—*Ewald Meal (Sagal Marks and Kantor)*

No. of cases ..	1461	46	357	41	Probabilities.		
Diagnosis ..	"Normal."	Gastric ulcer.	Duodenal Ulcer.	Cancer of stomach.	Case A. (i)	Case A. (ii)	Case B.
Relative frequency %	n	g	d	c	$\frac{g+d}{g+d+2n}$	$\frac{c+g+d}{c+g+d+3n}$	$\frac{c}{g+c}$
Achlorhydria	10	2	0	45	0·91	0·61	0·96*
Sub-acidity	20	23	3	40	0·39	0·52	0·64
Normal ..	24	26	15	10	0·46	0·42	0·28
Hyperacidity	46	49	82	5	0·59	0·50	0·09

* Probability falls within useful range.

It is apparent by inspection that no help is obtained in Case A. The only diagnostic point is the absence of achlorhydria in duodenal ulcer, and even this is of no use if the possibility of gastric ulcer arises. In Case B the finding of achlorhydria is seen to have some significance, so that 2 per cent. of ulcers and 45 per cent. of cancers will be diagnosed as cancer. This means that 23·5 per cent. of our doubtful cases will be thought malignant instead of the real figure of 22·5 per cent.

There is of course nothing new in this but it is interesting to note the sort of accuracy which may be expected. Perhaps the most important point which emerges is that in the absence of achlorhydria the test-meal contributes nothing to the solution of the diagnostic problem.

The anomalous position of gastric as opposed to duodenal ulcer may be commented upon here. The Ewald, and to a less extent the fractional test-meal, fails to reveal the hyper-acidity in gastric ulcer which in the histamine test is apparently identical with that found in duodenal ulcer. Although this might be thought an advantage in the differential diagnosis of gastric from duodenal ulcer, it is heavily outweighed by the approximation between gastric ulcer and carcinoma, which is a much more vital matter. It is interesting to note that the results recently reported from the Mayo Clinic by Vanzant et al.[3] even show a diminished acidity in gastric ulcer, although on the other hand the incidence of achlorhydria is reduced. Whatever may be the reason for this unusual finding,† it is certainly not an argument in favour of the Ewald meal.

THE FRACTIONAL TEST-MEAL (Table II.)

The data are taken from Koyihar,[18] in which the usual type of gruel meal was used. The "normal" figures are those for 311 cases of multiple diagnosis, excluding ulcer, gastric cancer, and pernicious anæmia. It will be seen that no superiority over the Ewald meal can be claimed. The only significant finding is again that of achlorhydria in Case B, and 2 per cent. of ulcers and 43·5 per cent. of carcinomas are involved. 22·7 per cent. of our doubtful population will be diagnosed as cancer instead of the true 21·7 per cent. There remains of course the advantage of examining the resting juice.

TABLE II.—*Fractional Test-meal (Koyihar)*

No. of cases ..	311	50	100	23	Probabilities.		
Diagnosis ..	"Normal."	Gastric ulcer.	Duodenal ulcer.	Cancer of stomach.	Case A. (i)	Case A. (ii)	Case B.
Relative frequency %	n	g	d	c	$\frac{g+d}{g+d+2n}$	$\frac{c+g+d}{c+g+d+3n}$	$\frac{c}{g+c}$
Achlorhydria	14·8	2	0	43·5	0·07	0·51	0·96*
Hypochlorhydria	9·9	8	1	21·7	0·31	0·51	0·73
Low normal	14·5	24	4	8·7	0·49	0·43	0·27
Normal ..	34·1	26	16	13·1	0·38	0·35	0·33
High normal	12·9	20	28	8·7	0·65	0·60	0·30
Hyperchlorhydria	13·8	20	51	4·3	0·72	0·65	0·18

* Probability falls within useful range.

THE HISTAMINE TEST (Table III.)

Polland[12] examined 988 persons, of whom 654 were found on examination to be free from any disease likely to affect the gastro-intestinal tract.

† It may be mentioned in passing that Vanzant et al. calculate the probable error of the difference from the normal mean from the variance of the diseased population only. Although the variance of the normal population is smaller it is not entirely negligible, and it is just possible that the altered acidity in gastric ulcer might fall below the conventional level of significance if allowance were made for this. The figures necessary for the calculation are not given in their paper.

The figures in the Table refer to males of all ages. In Case A (i) 29·8 per cent. of normal persons, or 14·9 per cent. of our doubtful population, are affected; the presence of ulcer in them would be rendered very unlikely by the results of the test. In Case A (ii) the test is of no value. In Case B, 48 per cent. of ulcers and 81 per cent. of cancers, or 64·5 per cent.

TABLE III.—*Histamine Test (Polland)*

No. of cases ..	384	143	46	Case A.		Case B.
Diagnosis.	Normal.	Peptic ulcer.	Cancer of stomach.			
Highest total acidity.	Relative frequency per cent.			(i)	(ii)	
	n	u	c	$\frac{u}{n+u}$	$\frac{u+c}{u+c+2n}$	$\frac{c}{u+c}$
0– 19	10·4	0	68	0*	0·77	1·00*
20– 39	5·0	0	4	0*	0·29	1·00*
40– 59	9·4	2	15	0·18	0·66	0·88
60– 79	14·4	0	9	0*	0·24	1·00*
80– 99	16·0	18	2	0·53	0·39	0·10
100–119	18·5	32	2	0·63	0·48	0·06
120–139	19·8	36	0	0·65	0·48	0*
140–159	6·5	12	0	0·65	0·48	0*

* Probability falls within useful range.

of our doubtful population, are helped. In the remaining 35·5 per cent. no relevant information would of course be obtained.

As a more qualitative deduction we may say that the cases overlap principally in the zone of total acidity from 80–119, which includes 52 per cent. of ulcers but only 4 per cent. of carcinomas. Ulcers are very rare below these limits and cancers very rare above them.

These deductions are obviously affected by errors of random sampling. A more correct approach to the problem consists in the calculation of the means and standard deviations of the acidity in cases of ulcer and cancer, when a better estimate of the distribution is obtained. This has been done in Table IV. from Polland's data. It is evidently necessary to consider separately cases with total acidity below 20, since they form a discontinuity in the data. Unfortunately only 15 cases of cancer with free hydrochloric acid are thus available for analysis, but although this number is small the assumption of a normal distribution appears to be preferable to the alternative of ignoring sampling errors.

TABLE IV.—*Histamine Test (Polland). Males with total acidity above 20 units. Calculated from Fisher's*[21] *table of the normal distribution*

No. of cases ..	15	135	—
Diagnosis	Cancer of stomach.	Peptic ulcer.	
Mean	54·3	116·9	
Standard deviation	23·6	18·8	Probabilities.
	Relative frequency per cent.		Case B.
Internal.	c.	u	$\frac{c}{u+c}$
20–40	20·0	0·002	1·000*
40–60	32·2	0·2	0·99*
60–70	15·3	0·5	0·97*
70–80	11·5	1·7	0·87
70–100	11·1	16·0	0·41
100–110	1·7	17·4	0·09
110–120	0·6	21·0	0·03 *
120–140	0·4	32·6	0·01 *
140–160	0·02	9·5	0·002*

Accepting 70–110 as the doubtful range, it will be seen that only 1·0 per cent. of cancers are likely to lie above and only 0·7 per cent. of ulcers below these limits. Expressing these in relation to the cases which fall within the useful range 1·3 per cent. of cancers and 1·1 per cent. of ulcers will be incorrectly diagnosed.

* Probability falls within useful range.

It will be seen from the Table that this method indicates a further improvement in the separation of the two diseases. 24·3 per cent. of carcinomas and 35·1 per cent. of ulcers fall within the zone of overlapping, so that the diagnosis is helped in the remaining 75·7 per cent. of cancers and 64·9 per cent. of ulcers. Further, in only 1·3 per cent. of these cancer cases and 1·1 per cent. of ulcers will the diagnosis be incorrect. Since the range from 0–20 represents a virtual certainty‡ (68 per cent. of cancers and no ulcers), we have for the whole group 92·2 per cent. of cancers and 64·9 per cent. of ulcers, or 78·5 per cent. of the doubtful population in which useful indications are obtained.

Discussion

It will be seen that this method of inquiry has demonstrated a substantial advantage of the histamine test over the Ewald and fractional tests, which were found to be of equal utility. The results may be summarised thus:—

CASE A.—(i) Histamine gives useful indications in 14·9 per cent. of doubtful cases. Ewald and fractional test of no value. (ii) No test of any value.

CASE B.—Histamine useful in 78·5 per cent. of doubtful cases. Ewald in 22·7 per cent.; fractional in 21·5 per cent. (both of these confined to achlorhydria).

These conclusions are of course based only upon the height of acidity reached and do not take into account the value of examining the resting juice and of detecting blood in the specimens. On these two points the fractional test is superior to the Ewald. The only drawback to the histamine test is its failure to demonstrate gastric motility, which is probably of minor importance

These results are strongly in support of the claims of Bloomfield and Polland, whose arguments need not be recapitulated here in detail. It is becoming more and more obvious that in attempting to differentiate between two diseases associated respectively with a high and a low gastric secretion, the most serviceable test is that which gives most information about gastric secretion as such. The histamine test is the only one in which the actual volume of pure gastric juice secreted within a measured time under the influence of a standardised stimulus is made available for direct examination.

I am therefore inclined to accept the arguments in favour of the histamine test, and also Polland's remark to the effect that further modifications of technique are not likely to be of much value. The only suggestion one can make is that further tabulation of the volumes of acid secreted (=concentration of acid × volume of juice) should be undertaken as they appear to show a wider divergence in ulcer and cancer than either volumes or concentrations alone. It also appears unwise to take the greatest 10 minutes volume as the secretion index, for it is too liable to be affected by difficulty in emptying the stomach. In the course of work now in progress on normal students, Lander and I[19] have taken instead the volume secreted from 10–50 minutes, multiplied by

‡ According to Palmer and Heins[20] no undoubted case of benign peptic ulcer associated with achlorhydria after histamine has been recorded. Dr. F. P. L. Lander allows me to state that he has seen such a case, proved by microscopic section. There is, however, no doubt as to the extreme rarity of the association.

1·5, to give a rate of secretion per hour. This should reduce the errors of volume estimation to one quarter.

Some opposite conclusions of Comfort and Osterberg [20] must be noted here. These workers made a direct comparison of the Ewald and histamine tests on 120 patients, and could find no advantage in the use of histamine. Their results with histamine were, however, strikingly different from those of Polland in several respects, noticeably in the greater overlapping of cancer and ulcer cases and in the difference between gastric and duodenal ulcers. Since Polland's series contains a much larger number of cases it would seem that we must accept it in preference pending further confirmation by others.

In conclusion, some obvious criticisms of the methods of calculation may be anticipated. It must be freely admitted that a number of assumptions have been made which are not strictly accurate, and that a number of relevant facts have been ignored owing to poverty of data. The inquiry may perhaps be considered to have served a useful purpose if only to expose the lack of existing knowledge on these points. The fact that the same assumptions were applied to each of the three tests still leaves some justification for drawing conclusions as to their relative value.

The principal flaws in the method lie in the following considerations:—

(1) Age and sex have been largely neglected. We now know, thanks to the work of Vanzant et al.[11] and of Bloomfield and Polland,[12] that gastric acidity decreases with age and is higher in the male sex. What are required, therefore, are detailed standards for each sex and for each decade, to include ulcer and cancer as well as normal persons. When these become available the accuracy of test-meal diagnosis will be materially increased. Polland's normal standards fulfil a long-felt want but he has not tabulated in detail the volumes of acid secreted. Since it is hardly likely that any one clinic will have sufficient material to establish satisfactory pathological standards, it is to be hoped that future publications will give full details of the age and sex of their patients so that their results may eventually be pooled.

(2) We have assumed the same distribution of acidity in doubtful carcinomas and ulcers as in carcinomas and ulcers in general. Further data are certainly necessary on this point. It has previously been supposed that the test-meal failed in just these cases, for malignant ulcers are frequently accompanied by the presence of free hydrochloric acid, and, as we have seen, the older test-meals cannot then give any additional information (unless of course characteristic signs are present in the resting juice). Bloomfield and Polland,[1] however, claimed to find a low output of acid in such cases by the histamine test, and certainly they have recorded many cases of carcinoma with free acid present but yet well outside their ulcer range. If this finding be confirmed the histamine test should prove of the greatest value in these cases.

The question of malignant degeneration in a simple ulcer is not so hopeful, and we can hardly hope at present that any assistance will be forthcoming in these cases, which are likely to show an acidity within the ulcer range.

(3) Only in one case has the attempt been made to allow for errors of random sampling, and this can only represent a first approximation owing to the inadequacy of the available data.

Conclusions

(1) A new method has been developed by means of which the efficacy of the test-meal in the differential diagnosis of ulcer and cancer of the stomach may be tested. This has been applied to typical data from the Ewald, fractional, and histamine tests with the results given below.

(2) The test-meal is of little value in cases of suspected ulcer.

(3) In the differential diagnosis of doubtful gastric lesions demonstrated by X rays, the test-meal may be of considerable value in a proportion of cases. This proportion is much the highest in the histamine test.

(4) The histamine test is superior to the other two. The Ewald and fractional tests are about equal except that the examination of the resting juice gives an advantage to the fractional test.

(5) The limitations and possibilities of this method of calculation are discussed, and the need for further data is emphasised.

It is a pleasure to express my thanks to Prof. E. C. Dodds for his advice and criticism.

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TETANUS TREATED WITH CURARE

BY LESLIE COLE, M.D. Camb., F.R.C.P. Lond.
PHYSICIAN TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE

CURARE is an arrow poison used by the natives of South America to paralyse their game. They prepare it in the form of a black resinous extract from the bark of plants of the genus strychnos, which they store in gourds, earthenware pots, or bamboo sticks. A number of plants may be used in preparing the extract, and the strength of the crude preparation varies considerably in different samples. Boehm [1] found that different preparations might contain different alkaloids, most of which have a paralysing action and are typified by curarine. Their action is similar to that of the crude drug. One of them, however, curine, is a weaker poison and has an entirely different effect, for it acts upon the heart.

The chief effect of curare is to paralyse voluntary movement by blocking the passage of impulses from the peripheral nerves to the muscles. The point of action is thought to be the end-plates of the motor nerves. The voluntary muscles are first paralysed and later the respiratory muscles, death taking place from asphyxia.

The idea of using curare to control the spasms of tetanus is not new, for it is mentioned in several older medical text-books. Hunter [2] used it in a few

desperate cases, but apart from this, accounts of cases in which it has been used are difficult to find.

Hartridge and West [3] have used curare to control tetany in parathyroidectomised dogs. They found considerable variation in strength of different samples and that two specimens out of seven possessed the power of removing tetany in the dog without causing paralysis. West [4] used one of these two samples in the treatment of 17 cases of muscular rigidity, resulting from diseases of the pyramidal and extrapyramidal motor systems. In doses which caused no detectable weakness or loss of power there was considerable reduction of rigidity while under the influence of the drug. He suggests that some samples of curare may contain a second active principle which has a selective action in that it can abolish rigidity in certain rigid states without causing paralysis, and mentions the possibility of using curare in tetanus. These observations show that different samples of curare vary considerably both in strength and action, and the dose is therefore a question of difficulty.

The sample used in the case here described was given me by Dr. J. F. Gaskell [5] and was of the "gourd" variety. It was the most potent of ten samples whose paralysing power had been compared by injection into leeches. Doses up to 32 mg. had been given to a patient with pyramidal rigidity, and this observation formed the basis of dosage in these cases. Prof. Hartridge tested the potency of this sample for frogs and found that 0·005 mg. is the lethal dose for a frog weighing 26 g., and that it paralyses frogs from that amount to 0·0025 mg.

THE FIRST CASE

A labourer, aged 39, in the afternoon of Monday, Jan. 15th, while cutting reeds, cut the tip of the second finger of the left hand on a reed. The wound was a deep one. He treated it by soaking it daily in hot water. On Monday, Jan. 22nd, he found difficulty in opening his mouth, and his throat felt stiff on swallowing. On the 23rd the stiffness of the jaw and the difficulty with swallowing were much worse and he had spasms of pain in the neck and back. On the 24th all these symptoms were worse, and he was admitted to Addenbrooke's Hospital at 1 P.M.

State on admission.—Severe spasm of masseters. Risus sardonicus. Back arched and rigid, abdomen boardlike. No relaxation between spasms. Some stiffness of arms and legs but no local tetanus. Whitlow of tip of second finger of left hand, fluctuant and full of pus. Scar of wound on lateral aspect of finger. No œdema of hand or lymphangitis. No teeth present in upper jaw.

Treatment on admission.—200,000 units of antitoxin were given intravenously and 2000 subcutaneously on either side of the infected finger. Half an hour later the whitlow was incised and washed out with hydrogen peroxide. No further antitoxin was given.

Progress.—Spasms began shortly after admission and increased rapidly in severity. By the evening the patient was having severe spasms which were brought on by the slightest sound or movement, and these occurred every minute or so. Opisthotonos occurred during the spasms, the back was rigid and arched between spasms, and the abdomen boardlike.

The sedatives used during the course of the illness were avertin and paraldehyde given rectally and occasional small doses of morphia. 7·3 c.cm. of avertin (full dose for basal anæsthesia) was given every night for eight nights. From three to five drachms of paraldehyde were given rectally dissolved in normal saline every day for ten days. Food in the form of glucose lemonade, milk, and egg and milk were given hourly when the patient was awake. The fact there were no teeth in the upper jaw made feeding a good deal easier.

By Jan. 26th, however, the spasms were getting more frequent and severe, and the patient was showing signs of exhaustion. Treatment with curare was therefore begun. Four doses of 32 mg. were given subcutaneously at six-hourly intervals beginning at midday on the 26th. Within two hours of starting this treatment the spasms were less severe, the rigidity of the arms and abdomen was less, and the spasm of the masseters was less, so that feeding was made a good deal easier. The patient had less pain and was more comfortable. He complained of no abnormal sensations after injection and there was no evidence at any time of difficulty in breathing. The pulse-rate however continued to rise. Observations on the blood pressure and reflexes could not be made. This improvement continued for 48 hours, but on the 29th spasms and rigidity began to get worse again. He was therefore given three more injections of 32 mg. of curare at six-hourly intervals. Following this the same effects were observed and the same improvement occurred, but the pulse-rate still remained rapid. On Feb. 1st spasms and rigidity again began to get worse, and so one more injection of 32 mg. was given. Following this there was steady improvement and the spasms gradually became less and ceased on Feb. 6th. The rigidity of the abdomen and back and the opisthotonos gradually passed off and had disappeared by Feb. 17th. No abnormal symptoms were observed during convalescence, but the wasting and weakness of the forearms and legs were very marked. Before discharge on Feb. 28th the patient could walk about the ward and the central nervous system showed no abnormality. One month later he was perfectly well but for some weakness of the arms and legs.

THE SECOND CASE

The patient, a boy aged 7, on July 12th fell off his bicycle and grazed his left elbow, knees, and right heel on the road. The wounds were slight and superficial, except that on the heel which was rather deep. No treatment was given. On the morning of the 14th he seemed out of sorts and complained of stiffness of the jaw on trying to eat, and pain in the neck, shoulders, and left side of the chest. These symptoms grew steadily worse and he was admitted to hospital on the 15th.

State on admission.—Continuous rigidity of the abdomen and back with stiffness of the jaw and risus sardonicus. The stiffness was made worse by noise or manipulation, and occasional slight spasms with opisthotonos occurred. The wounds had scabbed over.

Treatment and progress.—100,000 units of antitoxin were given intravenously and the wounds were cleaned. Rigidity and spasms became more severe and frequent. At 10.30 P.M. the jaw was continuously clenched, the back arched and rigid, the abdomen boardlike, and the limbs stiff. Spasms of the most intense severity occurred every 30 seconds and were caused by the slightest sound or touch. The attempt to give water with a spoon brought on severe spasms, swallowing was impossible, and attempts to suck fluid through a tube had the same effect. Perspiration was profuse, temperature 104° F., and pulse-rate 140–50.

At 11.30 P.M. 7·5 mg. of curare were given subcutaneously. Five minutes later the spasms were less severe, the reflex excitability was less, and the limbs were less rigid. At 11.40 7·5 mg. were given; at 11.50 15 mg.; and at 12.10, 15 mg., with progressive improvement. After the last injection of curare the rigidity of the abdomen had disappeared between spasms, the limbs were relaxed, the mouth could be opened, and fluid could be sucked and swallowed without bringing on spasms. Reflex excitability had almost disappeared, and the arms and legs could be manipulated freely. Only occasional slight spasms occurred throughout the night. At 1 A.M. there was some respiratory difficulty, but this improved. The pulse, however, grew weaker and more rapid, and the temperature rose steadily to 108° F. at 5.30 A.M. The respiration then began to fail and the child died at 6.20 A.M.

DISCUSSION

These cases of tetanus are 2 of a series of 19 cases I have treated during the last six years. Of the 19 patients 11 recovered. All of them, including the two which received curare, were treated on the same general lines, each being given a large dose of antitoxin by the intravenous route as early as possible and before the wound had been touched. The first case treated with curare and described above was certainly the most severe of those which recovered.

In both cases here described, curare seemed to reduce the continuous rigidity of the limbs, abdomen, and jaw muscles, to lessen reflex excitability, and to lessen the frequency and duration of the spasms. In Case 2 the severe spasms, induced by attempting to suck fluid and even by the sight of fluid, were stopped and swallowing was made possible. In Case 1, in which the dose was relatively small, the action of the drug was first apparent about two hours after the first injection. The effects appeared to last about forty-eight hours. In Case 2 the effects first appeared five minutes after the injection.

It is possible that in Case 1 the action was sufficient to tide the patient over the critical period of the illness by preventing exhaustion and by allowing more food to be given. No unpleasant symptoms were observed while the drug was being given and respiration did not appear to be effected in any way. No serious after-effects were noted, though it is possible that the rather prolonged weakness and wasting of the muscles of the arms and legs may have been due to the curare.

The second case was of such rapid onset (incubation period 48 hours) and intense severity that there was no chance of recovery. Treatment might have been more effective in prolonging life if it had begun a few hours earlier. Given however when rigidity was continuous, and reflex spasms of the most intense severity were occurring every thirty seconds, curare checked the spasms, stopped the reflex excitability, and made the rigidity very much less. Respiratory failure only occurred seven hours later when the heart had begun to fail.

Observations on these two cases are encouraging and confirm the suggestion that curare or its alkaloids will be useful in the treatment of tetanus. Dosage however is at present a difficult problem, and will remain so until standardised preparations are available and more is known of the particular actions of its various alkaloids.

I am indebted to Dr. Gaskell for the curare used in these cases, and for allowing me to treat Case 2, and to Prof. Hartridge for testing the potency of this sample on frogs.

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SPINAL MANIPULATION

WITH SPECIAL REFERENCE TO LUMBOSACRAL STRAIN AND BRACHIAL NEURITIS

By Thomas Marlin, M.D. Glasg., D.P.H., D.M.R.E.

MEDICAL OFFICER IN CHARGE OF THE MASSAGE, LIGHT, AND ELECTROTHERAPEUTIC DEPARTMENTS OF UNIVERSITY COLLEGE HOSPITAL

In a study of the methods commonly used for manipulating the spine, whether it be by the "osteopath's twist" or by the forcible movements under an anæsthetic as practised by orthopædic surgeons, one cannot help feeling that generally an unnecessary amount of force is used. This does not mean necessarily that the operator uses too much force to gain his end by his particular technique, or that no benefit accrues from such manipulation. But it seemed that it would be a great advantage if a method could be devised, which, while still effective in producing the movement, would be more pleasant to the patient and produce less reaction in the surrounding tissues. This is important, for a patient who has once been hurt naturally resists if the manipulation be attempted on a subsequent occasion. Hence we desire a movement which can be done with the minimum amount of force. Then certain parts of the spine are difficult to manipulate. Different workers, using different techniques, and many of them displaying much ingenuity, have managed to produce a movement at practically every intervertebral joint, but two regions for various reasons have always presented difficulties. These two regions are the lumbosacral junction and the first dorsal segment including the first rib. Accordingly it would be an advantage in devising any new method if such technique could embody a principle which would make it effective for those two regions.

Working in collaboration with H. Goehring of Pennsylvania I have developed a method which apparently meets the case. It is not unpleasant to the patient, does not cause much discomfort or reaction afterwards, and can be used effectively for the whole spine except the cervical region, where several other methods are in vogue. We early came to the conclusion that of all forms of forcible movements, traction or extension was the least disagreeable to the patient. In our own fingers, for example, we could produce a separation of the joint surfaces of the inter-phalangeal or metacarpo-phalangeal articulations by flexing those joints and then forcibly pushing them a little further into flexion. Such a proceeding caused considerable discomfort, whereas the same result could generally be attained by pulling on the digits, and this was not in the least degree painful.

Now most spinal manipulations rely for success on such movements as flexion or extension, rotation or twisting, or on thrusts of various kinds, and it occurred to us that, taking a lesson from what we had found in our fingers, we might try to exploit the principle of traction; but the difficulty was to be able to fix the spine at any given level.

For instance, with a patient on his back, if we took hold on of his head, one hand beneath the occiput and the other under his chin, and made traction, it was possible by giving little tugs on the head to produce movement at various levels of the cervical spine. With this procedure, however, we were not able to control the exact level at which movement took place.

A similar problem arose with respect to the rest of the spine. If the patient were on his back and we tugged on the feet, sometimes movement might take place at the ankle or the knee, very often it occurred at the sacro-iliac joints, and sometimes at the lumbars or lower dorsals. The site at which movement took place probably varied with the point of friction between the patient and the couch, and the height at which the feet and legs were held when the tug was administered, but certainly was not within the control of the operator.

Various methods and devices were tried with a view to fixing the spine at different levels while the pull was being administered. The body was put into different positions, the trunk held at varying angles to the horizontal, and straps applied in a number of ways, but nothing appeared to fulfil the purpose till the idea suggested itself that the end might be achieved if two operators took part in the manipulation. Each operator must be capable of doing either part of the manipulation, and each should know exactly what the other is expecting to do or feel. Once this absolute understanding has been established between them the method is simplicity itself.

A strong couch is required, suitably padded, and with detachable pillow, so that the patient can lie quite flat. It is essential to have the covering of the

couch of some material other than leather, and for this purpose a corduroy cloth is recommended, so that the friction between the patient and the couch should be as great as possible. For a physician of average stature a convenient height for the couch will be about two feet, which is somewhat lower

FIG. 1.—Manipulation of upper dorsal vertebræ.

than couches are generally made, but it is easy to have the legs cut down to the required height.

The patient lies on his face, head turned to either side, and grasps the two top corners or legs of the couch, while the operator at the foot of the couch takes hold of the ankles. An assistant bends over the patient with his hands on either side of the spine, and exerts a considerable pressure vertically downwards on the patient's back at any desired level (Figs. 1 and 2). The first operator, raising the patient's feet, legs, and part of his body off the couch, gives a steady pull, and if necessary augments this with a tug. Success of this team manipulation depends on the coöperation between the two operators, and though one of them is designated the assistant, this is for purposes of description. The assistant may nod or use some prearranged signal to show that he is making

FIG. 2.—Manipulation of lumbar and sacral region.

his pressure, and the operator at the feet, who meanwhile has been awaiting the signal, pulls at exactly the correct instant. The assistant indicates whether the desired movement has taken place, then another attempt may be made if necessary, or a tug administered. If the assistant's pressure is made at the level of the fifth dorsal vertebra (Fig. 1), then the spine from that vertebra upwards will be fixed, so that the movement will tend to be at the articulations between the fifth and sixth dorsals. By suitably altering his hands the movement can be directed to the lumbo-sacral (Fig. 2), or any other level as the assistant wishes.

Certain points should be noted. In this method of manipulation no loud snap takes place. There may be a soft noise, not easily heard, so the operator pulling on the ankles is generally not aware whether he has produced movement. The movement, in fact, is only slight, and only detected when the assistant is carefully watching for it. He must keep a very steady pressure and not allow his hands to slip over the patient's skin while his fellow worker makes the pull; hence it is practically impossible to carry out this treatment over a silk garment, for this slips readily under the fingers.

Another point is that in most cases only slight traction on the ankles is sufficient. The movement seems to take place almost before we are ready to appreciate it. If that is so without having the patient anæsthetised, then is it not possible that many people suffer injury to their spines as they lie stretched out completely relaxed under deep anæsthesia on the operating table, and even if they get over that ordeal, are they always treated with due respect as they are hoisted from table to trolley and from trolley to bed

FIG. 3.—Manipulation of the left first rib, showing position of the operator's hands.

by people who do not realise the delicate task they are performing?

BRACHIAL NEURITIS

When we come to consider brachial neuritis certain points stand out. Along with the weariness and aching in the arm complained of by the patient, we may detect tenderness on pressure alongside the vertebral border of the scapula and in the prescapular tissues. There is often pain on pressure at the insertion of the levator anguli scapulæ, perhaps spasm in the muscle itself, and not infrequently pain in the side of the neck corresponding to the insertion of this muscle. These are accompanied by limitation of movement of the scapula or of the cervical vertebræ, and various methods are adopted for freeing up these structures. But the important thing which may be overlooked is the part played by the first rib. It is not uncommon when palpating in the supraclavicular region to find the first rib sensitive and slightly more prominent than its fellow, as if pulled up on the affected side. Perhaps such a condition could be initiated by such an act as sneezing, when, owing to the peculiar attachment of the scaleni muscles, the first rib might be drawn up and cause interference with part of the brachial plexus. Accordingly, treatment should be directed to freeing-up the first rib, and this, as was pointed out, has always been one of the difficult problems.

A single operator, trying to manipulate, say, the first left rib, might proceed in the following manner. The patient lies on his face, no pillow, head turned to the left, and arms hanging down over the edge of the couch. The operator, standing on the right side, places the heel of his left hand against the angle of the rib under consideration, then with his right hand he grasps the patient's chin and rotates it as far as possible to the left and holds it in that position (Fig. 3). With his left hand he now delivers a downward thrust—i.e., in a postero-anterior direction—against the angle of the rib, and this sometimes gives the desired movement. Now this thrust is not at all pleasant to the patient, and in rough hands a great deal of pain may be inflicted without producing any beneficial result. The team technique, however, overcomes all this discomfort. The operator, taking his hold as above, draws the chin to the limit of rotation, and makes a steady pressure over the first rib, but avoids making any thrust. Then the assistant, also standing on the right side, grasps the patient round the thighs, and raises the legs, pelvis, and trunk off the table, at the same time making traction on the thighs. When the trunk is raised to a particular height a distinct movement of the rib will probably be felt, without any discomfort to the patient.

When this has been done strapping should be applied for a few days to take the weight of the arm off the shoulder. Naturally, other factors such as septic foci or dietetic errors would be sought for and corrected, but the intention of this article has been to draw attention to, and describe, a part of the treatment which is not generally understood—namely, the production of those movements which have been mentioned.

REGIONAL DISSOCIATIONS IN BLOOD PRESSURE

(CIRCULATORY ANISERGY)

By Maurice Villaret
PHYSICIAN TO THE HÔPITAL NECKER; PROFESSOR IN THE PARIS FACULTY OF MEDICINE

L. Justin-Besançon
PHYSICIAN OF THE PARIS HOSPITALS; AND

René Cachera
INTERN OF THE PARIS HOSPITALS

In cardiovascular physiology the centre of interest has shifted; for it is now understood that the importance of the peripheral circulation has been underestimated.[1] Using the term in its widest sense, the peripheral circulation includes not only the superficial vascular supply of the extremities, but also the vascular supply of the deep viscera. Functionally, but not topographically, therefore, it is separate not only from the heart but also from vessels directly depending upon it, such as the large arterial trunks in the limbs.

Until recent years the attention of clinicians and physiologists seems to have been directed almost solely to cardiac function and circulatory conditions in the larger arteries. This outlook is unduly centralised; it tends to reduce to a simple problem in hydraulics all the conditions, admittedly very complex, which govern the distribution of the blood throughout the organism. Some writers have even attempted to express the laws governing circulatory equilibrium in a few mathematical formulæ. The heart was regarded as the only motor organ, and the arteries were regarded as simple, elastic, inert tubes. These structures were thought to be the only ones worthy of study, and agencies concerned in propelling the blood were considered negligible. The idea of vis a tergo was so simple an explanation of the facts that it was naturally regarded as final. It left conditions in the capillaries and entire venous system comfortably obscure, but this part of the circulation constituted only a degraded reflection of the central energy derived from the cardiac pump and merited no special attention.

Interest thus became wholly concentrated upon precise laws conforming to mechanical principles supposedly controlling the circulation within the principal arteries; and the success of this conception gave it sanction, since in practice the measurement of arterial pressure was alone considered fundamental. It was soon apparent, however, that the circulation could not be satisfactorily reduced to a problem in hydraulics. It was found, for instance, that the capillaries have an active rôle, together constituting a true peripheral heart; that there are peripheral autonomous vasomotor centres; and (most important) that reflexogenic vascular regions provide for the automatic regulation of arterial pressure which operates independently of the heart in very large degree.

The attention of clinicians was simultaneously directed to the desirability of measuring venous pressure and its pathological variations and to the part played by the peripheral circulation in phenomena of shock. Lately the importance of modifications in the equilibrium of the return circulation has been stressed anew, hypotonus existing in syncope and hypertonus in acute pulmonary œdema.

From the group of facts from which these few examples are drawn it is clear that classical views on circulatory equilibrium need revision. The decentralising of the cardiovascular system was considered by one of us in a recent paper,[2] in which experimental findings were presented and the following comment was made:—

> We believe it instructive to group together the facts which we are about to present, because they all support the same idea—namely, the existence of relative autonomy of the several circulatory sectors and their mutual independence of each other, permitting simultaneous regional conditions to occur in which the blood pressure is very different, both in arterial territory and the venous system. This fact shows us not only the decentralisation which is necessary, but the necessity of accepting a regional division, local or visceral, of vascular action. These simultaneous differences or oppositions, this multiplicity of reactions and their unequal character, have been designated by us, for greater convenience, as "circulatory anisergy."

PHENOMENA OF ANISERGY

We may now rapidly review the more distinct phenomena of anisergy which we have been able to show objectively in graphs simultaneously recording, in dogs, the figures of arterial pressure in different regions; also by comparing variations in arterial pressure with concomitant variations in the calibre of a visceral artery (the retinal artery, viewed with the ophthalmoscope); and still further by comparing tracings showing arterial and venous pressures.

The first procedure consists in comparing variations in general arterial pressure, as recorded at the central end of an artery, with those occurring at the same time in recurrent arterial pressure. The so-called "recurrent" pressure is that obtained by the aid of a cannula introduced into the peripheral end of an artery. The cannula, connected with an ordinary kymograph, measures the blood pressure maintained in the peripheral part of the limb through the existing anastomoses. This local pressure evidently reflects most notably the peripheral vasomotor actions

present, but it reflects other conditions as well, since it communicates by the anastomoses with the general pressure, upon which it consequently must depend in some degree. Curiously enough François-Franck, who used this technique, rejected it for this very reason, saying that "the peripheral segment of the artery presents pressural variations which are the same as those present in the general arterial pressure, on account of anastomoses, which render the peripheral system merely a diverticulum of the aortic system." It seems to us that this difficulty may be easily overcome and all sources of error avoided if the interpretation of variations in the recurrent arterial pressure be observed in relation with those in the general pressure. Under these conditions all modifications in recurrent pressure which are relatively greater than the simultaneous general arterial pressure, or which occur apart from variations in the general pressure, or, a fortiori, which are inversely related to variations in the general pressure, must evidently be due to local vasomotor action.

By this method we have observed considerable differences and dissociations in regional variations in arterial pressure. During constriction, as well as during dilatation, of the peripheral vessels produced by suitable pharmacodynamic agents, the recurrent pressure has risen or fallen in a degree not in proportion with concomitant fluctuations in the general pressure. For example, in one case the variation in the recurrent pressure was five times as great as that in the general pressure. Here we stress the thought that this is no ordinary phenomenon. It might, in fact, be objected that an agent stimulating peripheral vasomotor action should, logically, modify peripheral pressure first of all and principally, affecting the general pressure in a secondary and lesser degree, and that our tracings could merely show, in a distinct manner, a fact which might be predicted by common sense.

We have shown, however, that it is possible to vary the recurrent and the general pressures, in relation with each other, in widely differing ways according to the dose of the medicinal agent, the manner of introducing it, and consequently the addition of a cardiac to a vascular effect, and especially according to the intensity with which certain vascular sectors respond. Still further, one of our graphs showed a tracing in which the recurrent-pressure curve was opposite, point by point, to the general-pressure curve. Each ascent in one was contrasted by a perfectly symmetrical descent in the other.[3] In this connexion we said, "We do not think it possible to present a more striking example of circulatory anisergy than this one, showing two arterial pressures measured in two distinctly different regions and simultaneously affected by changes occurring inversely and symmetrically."

In the second procedure ophthalmoscopic examination of the retinal artery was associated with record of the general arterial pressure. We have thus been able to show that the state of dilatation of the retinal artery is relatively independent of the degree of the general arterial pressure, whether high or low. This fact was demonstrated by various methods utilising different medicinal agents, in different doses, and in different combinations. Collaborating with Mrs. Schiff-Wertheimer, we obtained the following findings:—

(a) In man the subcutaneous injection of 20 cg. of acetylcholine dilates the retinal artery, even in the absence of any decline in the general arterial pressure.

(b) In dogs, inversely, different doses and the use of methyl-acetylcholine produced arterial hypotension persisting for a long time after cessation of dilatation in the retinal arterioles.

(c) Again, and as in our most striking example of peripheral circulatory anisergy shown by contrary variation in two different pressures, dilatation of the retinal artery, actively produced in the presence of well-developed arterial hypertension, constitutes a most striking splanchnic circulatory paradox. We obtained it by simultaneously or successively injecting adrenaline and acetylcholine into dogs.

These different examples justify the conclusion that arterial hypotension or hypertension and dilatation of the retinal artery are two easily dissociable phenomena.

In a third series of studies we examined comparatively variations in venous, general arterial, and recurrent pressure under various influences. The variations in the three different pressures were recorded simultaneously, the test animal being the dog. Just as we observed distinct regional dissociation in changes in the arterial pressure, we were able here to show the extreme freedom existing in reciprocal variations in the venous and arterial pressures. Under certain conditions these pressures may be totally independent of each other, rise or fall in one being unaccompanied by any modification in the other.

Looper, Lemaire, and Patel have previously reported similar facts.[4] They showed that during a period in which arterial pressure rises in the normal dog under the action of adrenaline or falls in dogs previously treated with yohimbine, the effect of adrenaline on venous pressure remains unchanged, consisting of venous hypertension, both after and before treatment with yohimbine. The phenomenon which we observed was an inverse one, but had similar significance from the viewpoint now concerning us.[5] In exploring the peripheral circulation we observed that adrenaline either raises venous pressure or leaves it unaffected, according to whether the vagi are intact or divided, while the general arterial and the recurrent pressures are considerably raised in all cases. The same result is produced by using atropine instead of vagal section.

Consequently the two examples selected show total absence of parallel action in variations, in no wise reciprocal, occurring in arterial and venous pressures.

True, the causation of the pressural variations is here more complex, the venous pressure being closely related to the cardiac output. Whatever the intimate mechanism of the phenomenon may be, however, and even if the peripheral vascular factors are not the only ones present, it is none the less suggestive to show objectively that the arterial and venous pressures are in fact mutually independent under certain conditions. This fact particularly emphasises the relative autonomy of the return circulation and the importance of examining it.

These data usefully supply precise facts and concrete examples supporting a new view of circulatory equilibrium. This newer conception tends to become ever more widely extended, but is too often considered only in a vague and general way. The applications of these theoretical ideas are very extensive in clinical practice. Before rapidly reviewing these applications and to avoid any exaggerated interpretation of the tendency just mentioned, we disclaim any suggestion that examination of the heart and of its functional condition and measurement of blood pressure are no longer of value. On the other hand, we do not think that these factors supply all the data which are important as to the condition of the cardiovascular apparatus, as hitherto considered. In fact, one of us combated this exclusive

view long ago in calling attention to the clinical importance of measuring peripheral venous pressure. As present ideas trend, they only confirm the sound basis of this view, which is by no means new.

CLINICAL APPLICATIONS

A knowledge of the regional dissociations in blood pressure, both in the arterial and the venous systems, allows of many deductions of pathological and diagnostic value.

1. *Pathological inferences.*—There is no need to recall the many pathological conditions modifying, within a limited vascular territory, the local arterial condition by vasomotor action occurring in different directions, but localised within a limited region. In the peripheral domain, erythromelalgia and Raynaud's syndrome constitute the two most representative examples. Although more difficult to recognise, deep and visceral vascular spasm limited to restricted areas is becoming more generally known. Some of the grave disturbances present in ophthalmology and otology are assigned to localised vasoconstriction. A case of lead colic recently published by one of us [6] should probably be interpreted as an effect of localised hypertension not affecting general blood pressure.

In neurology the growing importance of spasm limited to the cerebral arteries in causing motor effects, of deficiency or of stimulation, is a familiar fact. Four cases recently reported to the Société médicale des Hôpitaux de Paris by de Gennes [7] and by Pagniez, Plichet, and Decourt [8] show decisively the rôle of localised vascular spasm in producing subpermanent epileptic attacks, and also show the possibility of abolishing the spasm by means of acetylcholine. Finally, are not anisergical conditions in the greater and lesser circulation causative of certain forms of pulmonary œdema or infarct, of certain forms of syncope and even of some of the cases of cardiac failure, as reported by Lian, Laubry, and Tzanck, Gallavardin and Dumas?

2. *Diagnostic inferences.*—From these experimental and clinical examples an important practical idea follows—namely, that one cannot depend upon measurement of the arterial pressure in a large artery of a limb to ascertain the general state of the circulation. We do not minimise the primary importance of this measurement, but suggest that large inferences from data so obtained may be inappropriate. Findings in one part of the body are not necessarily applicable to the whole of it, as is too often assumed. Such generalisation implies uniformity in the vascular system, whereas all the facts presented here show there is a great deal of regional variation in the circulation.

One might, of course, go so far as to say that the measurement of blood pressure is valid only for the arterial sector examined. This is by no means our opinion. We nevertheless call attention to the fact that the degree of pressure present in the brachial artery is valueless for indicating the pressure present in a visceral territory, or even in the arteries of the fingers. We have emphasised the complexity of the various factors concerned in circulatory equilibrium. These factors appear largely autonomous, each with respect to the others and with respect to the heart. If this be true, it is easily evident that the knowledge of a single one of the entire group of factors, such as the degree of pressure present in the larger arteries, is not sufficient to supply information about the entire circulatory system.

Such are the conclusions derived from the experimental studies just reviewed. These studies show the relative independence of function in the different elements of the circulatory system. They reveal this system as an infinitely complex whole, in which the various parts operate in different ways.

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THE TREATMENT OF DEAFNESS

By D. F. Fraser-Harris, M.D. Glasg., D.Sc. Birm., B.Sc. Lond., F.R.S.E.
LATE PROFESSOR OF PHYSIOLOGY, DALHOUSIE UNIVERSITY

Strange as it may appear, there is no body of persons qualified to interpret an aurist's prescription for a deaf patient, and to supply the appropriate deaf-aid instrument, as there are opticians able to read an oculist's prescription and to provide the spectacles specified. Just as it requires a specialist—the oculist—to ascertain the precise nature and amount of departure from normality in vision, so it requires a skilled person to ascertain the precise kind and degree of deafness from which a deaf patient may be suffering. There are types and degrees of deafness just as there are types and degrees of departure from normal visual acuity.

The reason for this difference is that the science of optics has been developing for about the last two hundred and fifty years, while the great advances in the precision of electrical instruments for amplifying and transmitting sounds have all been made since the War. Especially is this true of the refinements that enable a specialist in acoustics to interpret an aurist's prescription, and so provide the deaf person with exactly that type of instrument which will compensate or correct his or her particular kind of deafness.

THE AUDIOMETER AND AUDITION CURVES (AUDIOGRAMS)

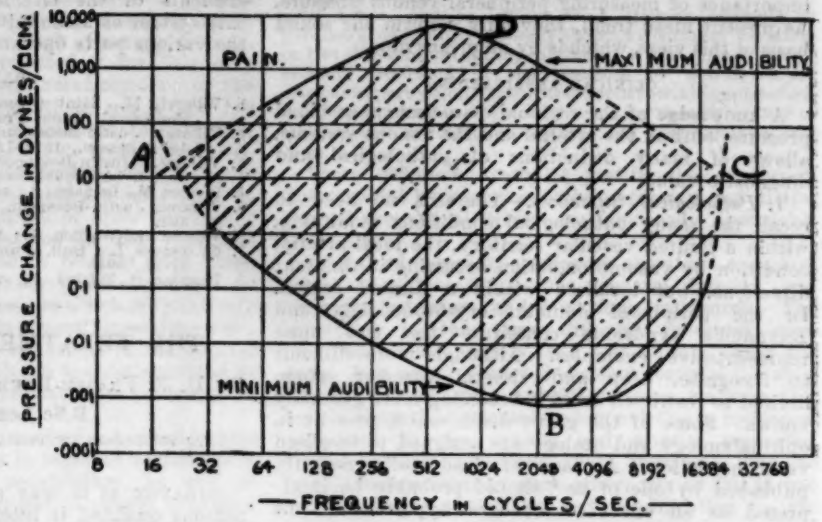
To understand the great advances recently made in the diagnosis and estimation of deafness we must refer to an instrument, the audiometer, by which the deaf person is tested. One of the first descriptions given in this country of the instrument was in The Lancet in 1925—"The Audiometer and its application to Medical Research" (C. M. R. Balbi: The Lancet, May 2nd, 1925). The audiometer is in essence an instrument to which one listens through an ear-piece to a series of musical notes which can be varied in frequency and intensity. In the form developed by Radio-Aid Limited it has frequencies of 125 to 4000 cycles per second in eleven and a half octaves. The intensity can be adjusted from zero to 20 units of the scale which is in absolute units of air-pressure—i.e., dynes per square centimetre.

The audiometer will undoubtedly be used universally for all hearing measurements. It is operated by merely turning a dial to select the desired note, and by turning another dial to modify the sound intensity. The patient holds the telephone-receiver close to his ear and signals when the sound being listened to is only just audible. This intensity can be recorded on

a suitable chart, and it gives the threshold of audibility for the ear at this particular frequency.

From Fig. A we may learn several facts about normal hearing. In the first place we see that the range of normal audibility is through nearly 11 octaves. In the next place, it is evident that a note of frequency about 16 cycles per second is the lowest audible pitch, and that the intensity of the first audible note is of the order of ten dynes per square centimetre. Compare this with the note of about 2000 cycles frequency which can be heard when of an intensity so small as 0·0007 dynes per square centimetre. In other words, in normal hearing, the lower the pitch of the note below 2000 cycles the greater must be the intensity for the note to be heard.

FIG. A.—*Audition area for the normal ear*



Further, the curve A.B.C., which is the graphic expression of the threshold of *minimum audibility*, shows that notes of all pitches below the intensities marked on this curve are inaudible.

The upper limit of hearing, or *maximum audibility*, as expressed by the curve A.D.C. requires some explanation. This curve does not mean that notes of intensities greater than those on the curve are inaudible but that such notes have acquired a loudness which renders them disagreeable as music or unintelligible as speech.

Notes of extreme intensity are believed to be the means of reflexly inducing the stapedius muscle to go into a state of spasm whereby the stapes is jammed in the fenestra ovalis and so prevented from vibrating in unison with the membrana tympani. This reflex action is regarded as a protective mechanism whereby injurious violence on the part of the stapes is prevented. The condition of spasm of the stapedius has been likened to pin-point contraction of the iris in an excessively bright light which is also a protective mechanism.

At all events, extremely loud notes are very disagreeable æsthetically so that the region beyond the curve A.D.C. has been called that of "auditory pain." It clearly corresponds to painfully bright lights which blind the eye and convey no intelligible visual information whatsoever.

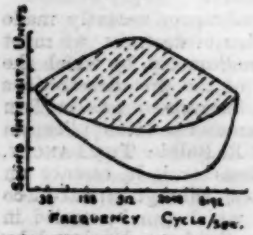
EXAMINATION OF PATIENTS

Suppose that we have tested a deaf patient, Mr. X, and obtained his audiometer chart (Fig. 1). It is evident that his deafness may be regarded as the *subtraction* of a certain intensity from the value of the notes as audible to a person with normal hearing. Mr. X's chart indicates some form of obstructive deafness, since it shows that his deafness is "uniform" or uninterrupted by any zones of hearing throughout the deaf area.

An inspection of Mr. X's audiogram will also indicate that a hearing aid whose amplification is uniform throughout the musical scale is the kind of device applicable to his case, for we shall thus be amplifying all the notes to which Mr. X is deaf. In other words, we shall have brought his abnormally high minimum threshold of audibility down to the normal level so that by the deaf-aid he is enabled to hear a sound which, without amplification, would be inaudible to him.

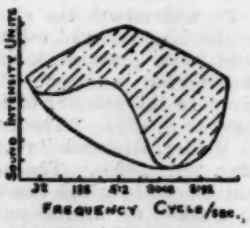
Thus, referring to Fig. 3, if we amplify the intensities of the sounds by a constant amount A, a sound of intensity X_1 (just otherwise inaudible) will now be heard

FIG. 1



Mr. X's audiometer chart.

FIG. 2



Mrs. Y's audiometer chart.

FIG. 3

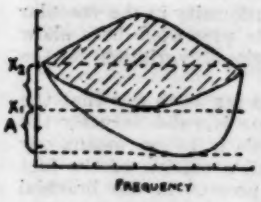


FIG. 4

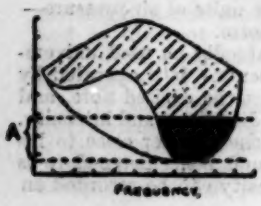


FIG. 5

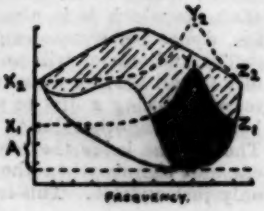


FIG. 6

as though it were of the sound intensity level of X_2.

In the next place let us consider a patient, Mrs. Y, whose audiometer chart is as in Fig. 2. An inspection of her chart shows that this patient is deaf chiefly to the lower notes of the scale, but has normal hearing for the higher notes. In other words, Mrs. Y has non-uniform or irregular deafness. This region-deafness has been called "aural astigmatism" (Balbi).

Now clearly it will not do to give Mrs. Y a deaf-aid which amplifies equally at all frequencies, because if this were done she would not even hear like a normal person in her region of deafness (the lower notes), the amplication A not being sufficient, but she would perceive sounds of high frequency (black area in Fig. 4), such as squeaks and scratches, with a distressing degree of distinctness. We may refer to the black areas in Figs. 4 and 5 as "super-sensitive" areas.

If non-uniform amplification were applied (as in Fig. 5) we might intensify the notes in this region to a loudness which was more distressing still, because even sounds of small intensity at this frequency would, on account of the peaked amplification applied, be brought up to a loudness which lies within the pain-area to which we have previously referred. Mrs. Y, in fact, needs *selective or differential amplification* in which sounds only in the region of the lower notes to which she is deaf are amplified leaving unamplified the upper frequencies where hearing is normal.

This kind of amplification suitable for aural astigmatism is provided by what is known as "filter circuits" and "automatic volume control." The principle of this is that the amplification provided shall be maintained so that the intensity shall always lie half-way between the thresholds of maximum and minimum audibility for the person concerned, as indicated in Fig. 6. These electrical corrections by "filter circuits" are now made by various arrangements of capacities, inductances, and resistances. It is a highly technical affair, but the problem of differential amplification has been elegantly solved.

The principles of prescription and of differential amplification were conceived some time ago by Mr. C. M. R. Balbi, who for a number of years was honorary consultant to the National Institute for the Deaf. Mr. Balbi wishes to put the treatment of deafness on a scientific basis, and at the same time prevent deaf persons falling into the hands of the quack as has unfortunately happened so often in the past. He has, moreover, demonstrated its utility by putting the invention on a practical footing, and is successfully operating it under a Limited Company called "Radio-Aid Ltd."

However, it is obvious that it is not for any one firm or individual to organise a controlling body, so this article has been written to make the suggestion that the time has come for a concerted effort to be made to form in this country a body of "auricians" (shall we call them ?) to correspond to the opticians. Opticians are registered after passing a qualifying examination; and analogously there should be a register of qualified auricians, who should organise themselves on the model of their brethren, the opticians, obtain their Charter of Incorporation, define the qualifications of membership, and in fact acquire for themselves that professional status to which they are now fully entitled.

Clinical and Laboratory Notes

AN INFLATABLE INTESTINAL BAG IN URETERO-COLOSTOMY*

BY JOHN EVERIDGE, F.R.C.S. Eng.
SENIOR UROLOGIST AND LECTURER ON UROLOGY, KING'S COLLEGE HOSPITAL

THE operation designed by Stiles [1] and the modifications of Coffey have given results so satisfactory as to make others hesitate to offer further modifications or additions. Grey Turner [2] demonstrated the effectiveness of the original Stiles operation in a series of 17 cases. Coffey's [3] main principle of technique differs in the method of emplacement of

FIG. 1.—Shows bag projected beyond open end of sigmoidoscope.

FIG. 2.—The bag in situ during Coffey No. 1 operation.

the ureter; he prefers to embed its length of contact within the muscular layers.

The technique now suggested has only been used in connexion with Coffey operations, and the primary reason for its introduction was to assist in that rather troublesome step, the formation of the musculo-submucous bed. Rugosity and vascularity of the bowel wall encountered as soon as the serous coat is penetrated render difficult a clean incision, since there is no firm surface to cut upon. In one of my cases I actually entered the bowel lumen before meaning to, oozing from minute vessels rendering recognition of individual layers difficult.

Material and technique.—Special material required: (1) A soft rubber bag equipped with a fairly thick-walled filling tube, at least 2 ft. in length. The bag when distended should be rather under 1½ in. in diameter. It may be stained with indigocarmine and is lubricated with liquid paraffin before introduction. (2) The introducer, an 18-in. length of rigid wire, at the distal end of which is a loop set at an angle. (3) A large graduated filling syringe—e.g., the Thomson-Walker bladder syringe.

Technique.—Having passed the sigmoidoscope to the pelvic colon, the filler tube is threaded through the loop of the introducer and the bag emptied of

* A note on the subject has been read before the section of urology of the Royal Society of Medicine (Proc. Roy. Soc. Med., 1934, xxvii., 951).

air. The end of the tube is clamped, and the bag is carried up beyond the open end of the sigmoidoscope and inflated with a known quantity of air. The sigmoidoscope and introducer are withdrawn, leaving the bag in situ. The proximal end of the tube and syringe are handed to an assistant to deflate or inflate, as may be necessary in the subsequent steps of the operation.

At the laparotomy the bag is usually found in the ideal position for the anastomosis. If not, it can easily be manipulated up or down. The remaining general steps of the operation require no separate description. References to the publication of Stiles, Grey Turner, and Coffey give full details. The bag is, of course, deflated before the sutures burying the ureter in the bowel wall are tied.

The advantages claimed are the following:

(1) By providing a firm, flat, tense surface a clean incision is more easily made the depth of which may be controlled with precision.

(2) Stretching of the bowel by the bag inflated to the optimum renders the area of incision ischæmic; only the large vessels will bleed, thus the field is less obscured.

(3) The blue stained bag shows up well and thus it is easy to recognise the smallest penetration of the mucosa.

(4) The size and disposition of the stoma may be most accurately controlled, since fixed tissues are being handled.

(5) Distension of the bag renders the operative field, and especially the region of the stoma, less liable to contamination, since fæces (from imperfect preparation) are displaced, mucus in the bowel is kept away, and the mucous coat is squeezed and flattened out. A clamp on the bowel is thus unnecessary if this technique is adopted. Should the other ureter already have been implanted infecting urine is prevented from contaminating the field.

(6) If Coffey No. 1 be adopted the needle bearing the stitch on the ureter is easily insinuated between the bag and the mucous coat and brought back through the bowel at the chosen spot and tied.

(7) If Coffey No. 2 is used a ligature is tied to the end of the catheter and threaded to a curved cutting needle, which transfixes a small knuckle of the bag allowed to collapse for the purpose. The bag is now withdrawn by traction on its tube and so the catheter, bringing the ureter neatly into position for the usual sutures.

This technique of delivery of the catheter appears simple and easier than other methods in use in Coffey No. 2—i.e., by attachment to gauze packing in the bowel, or manipulation of the catheters through a sigmoidoscope or other rigid tube, as suggested by Nitch [4] and Green-Armytage,[5] which remain in situ during the operation.

(8) If both ureters are transplanted simultaneously one or two bags may be used, depending upon the mode of implantation.

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ADMINISTRATION OF ANÆSTHETICS TO CHILDREN DURING SLEEP

BY W. R. SOMERSET, M.B. Edin.
HONORARY ANÆSTHETIST, THE ROYAL HOSPITAL, WOLVERHAMPTON

IN 1902 I wrote a short note [1] on the administration of chloroform to children during sleep. Since that time I have given anæsthetics to scores of sleeping children without any of them being aware of it, and I have found this method extremely useful for nervous children.

Every experienced practitioner knows that there are many children to whom the administration of a general anæsthetic is a very serious and difficult matter. Their horror of all things medical is so deep-rooted as almost to merit the term iatrophobia. They are terrified if taken to a hospital or nursing-home, and if they are given an anæsthetic the psychological effect may be so great that the results are life-long. Consequently only operations of the most pressing character are carried out, and those which are less urgent have to be postponed or even abandoned. There are also many minor operations which would be done if only there were some way out of the difficulty, and it is for such cases that the following method is especially useful.

The child is put to bed at its usual time and receives a dose of luminal gr. ½–1. At least two hours is then allowed to elapse before anything is done, so that the child may fall into a sound sleep. Three people are required, one to give the anæsthetic, one to hold the child's hands, and a third to turn on the light. For induction I always use ethyl chloride, which is sprayed liberally on an open mask outside the room. As soon as the door is opened an assistant grasps the child's hands and the mask is placed firmly on the face. There is always a struggle, but this is of short duration and the child soon goes under. As soon as the struggling ceases the light is turned on. After ethyl chloride I follow with C_1E_2 mixture or open ether, and the rest of the anæsthetic is uneventful. Next morning the child is not questioned, but I have never known one who stated that anything unusual had happened. Some have been surprised to find their head or a limb covered with bandages, or that some teeth had fallen out, but none have shown the slightest sign of alarm, or any suspicion that an anæsthetic had been given.

I have used this method for all kinds of conditions—e.g., extraction of teeth, dressing and sewing up wounds, setting fractures, and various minor operations—with the most satisfactory results. I have often found it to be a way out of a real difficulty, and I think it might with advantage be more widely used, especially in general practice.

[1] THE LANCET, 1902, i., 992.

NEW INVENTIONS

A NEW RUBBER PROCTOSCOPE

THE necessity of applying diathermy through the sigmoidoscope, as well as the usual diagnostic and therapeutic value of this instrument, has suggested a short rubber proctoscope as convenient for different practical purposes, the ordinary sigmoidoscopes and proctoscopes in general use having certain disadvantages. The rubber proctoscope (here illustrated) is handy to use, simple in construction, and can be

of great service for diagnosis and diathermy rectal work. The tube, which is six inches long, is made of vulcanised rubber. It has the advantage of being less rigid and cheaper than the ordinary metal one. It can be sterilised in formalin solution as a rubber catheter. If it is boiled it softens but regains its rigidity in a few minutes. As in other proctoscopes it has the further advantage of bringing the mucous membrane nearer to the eye. The knee-chest position

is the one of choice for introducing the proctoscope. The buttocks should be raised high to a level with the examiner's face, the shoulder low and the back well hollowed. This position helps the passage of the instrument, no inflation being required. It has also the advantage of not allowing any fluid coming from the intestine to dribble out through the instrument. Any electrical light device can be used with the instrument. The internal illumination as used in Dr. A. F. Hurst's short proctoscope, and supplied by Messrs. Down Bros., London, is very convenient for this purpose. Also the simple head mirror used by the throat specialists, or a head lamp, can be employed. In addition, many of the diathermy apparatus, now on the market, are fitted with external illumination. The commonest site for dysenteric and ulcerative conditions of the large bowel, as well as carcinoma and polypi, is within reach of the proctoscope, which may thus be of service for diagnostic and therapeutic measures.

I wish to express my thanks to the dean of the faculty of medicine, Dr. Ali Ibrahim Pasha, as well as to Prof. H. B. Day, the director of our medical unit, Cairo, for their encouragement and help. The proctoscope is supplied by Messrs. Moring and Co., 2, Soliman Pacha-street, Cairo.

M. A. ARAFA, M.R.C.P. Lond.
Kasr-el-Ainy Hospital, Cairo.

REVIEWS AND NOTICES OF BOOKS

l'Epiphyse (glande pinéale)

By Dr. JEAN CALVET, Professeur agrégé à la Faculté de Médecine de Toulouse. Paris: J.-B. Baillière et fils. 1934. Pp. 148. Fr.45.

THE mysteries of the pineal gland, which have formed a subject for speculation from the dawn of science up to the present day, are still unsolved. But it seems clear from the facts which Dr. Calvet has lucidly marshalled in this monograph, that the pineal plays an intricate part in the endocrine balance of the body, being particularly concerned with the rate of growth and sexual development. The author has been led, through his own histological and experimental observations, to suppose that the pineal body is a glandular organ and that it belongs to the endocrine system. In assembling the data which lead him to this conclusion he is at all times scrupulous in paying regard to the conflicting observations of other workers. After summarising in a series of short chapters the historical, embryological, anatomical, histological, and physiological aspects of his subject, Dr. Calvet outlines the clinical disturbances that are correlated with pineal tumours. The best known of these is the so-called Pellizzi syndrome, or precocious macrogenitosomia which occurs in childhood and is characterised by exaggerated growth, premature development of the sex glands and secondary sex characters and, inconstantly, by psychical disturbances. This syndrome is regarded by many authors as a result of pineal destruction with the consequent removal of pineal control. On the other hand, a similar kind of disturbance has been reported in cases in which the region of the mid-brain or the interpeduncular space has been occupied by a tumour and the pineal has been intact. The syndrome has not been observed when a pineal tumour is manifested in adult life. It is readily distinguished from the precocious sexual development that is associated with suprarenal tumours by the concomitant neurological signs and symptoms, and by the presence, in the suprarenal type of disturbance, of normal stature and an abdominal tumour.

A full bibliography enhances the value of this monograph.

Gonococcal Infection

By ROBERT V. STORER, M.R.C.S. London: John Bale, Sons and Danielsson, Ltd. 1934. Pp. 91. 7s. 6d.

IN writing about gonorrhœa Dr. Storer pays special attention to bacteriological diagnosis. His work is therefore more suited to the practitioner who makes his own films and his own diagnosis as to the presence or absence of the gonococcus, than for the medical man who is too busy to carry out his own bacteriology or else does not feel equipped for the task. In his preface the author states that his monograph "is intended to explain the principles which should guide the general practitioner in his management of those cases of gonococcal infection which come under his care." We doubt whether he has fully achieved this purpose. It is with the complications of gonorrhœa and with its symptoms that the general practitioner is chiefly concerned, and to these Dr. Storer gives little attention.

His book is clearly written; it is both interesting and suggestive.

Manipulative Treatment for the Medical Practitioner

By T. MARLIN, M.D., Ch.B., D.P.H., R.C.P.S. Eng., D.M.R.E., Medical Officer in Charge of the Massage, Electrotherapeutic and Light Departments, University College Hospital, London. London: Edward Arnold and Co. 1934. Pp. 133. 10s. 6d.

IN this small book Dr. Marlin sets out the technique which he has adopted successfully in various forms of manipulation, hoping that the descriptions, which are clear, terse, and accompanied by informative photographic reproductions, will lead readers to try out the movements recommended. Useful notes as to the apparatus necessary are given, and wise hints on the attire to be adopted not only by the patient but by the operator. The book closes with two interesting chapters, one setting out the reasons which should lie behind the choice of cases for manipulative treatment and the other pointing out that in spinal manipulation team technique or assisted technique may be of great value. Dr. Marlin in another place in this issue of THE LANCET (see p. 477) expounds this subject, using illustrations from his book.

The Healthy Infant

By E. R. C. WALKER, B.A. Camb., M.B., F.R.C.P. Edin., Clinical Assistant, Royal Aberdeen Hospital for Sick Children. With foreword by Prof. CHARLES MCNEIL. Edinburgh: W. Green and Son, Ltd. 1934. Pp. 137. 3s. 6d.

WHETHER it is that the modern parent prefers reading about healthy children to bringing them up, or whether it is simply that smaller families make the former diversion possible, it is certainly the case that the annual output of books concerned with the normal infant has increased enormously of recent years. Dr. Walker's little book is an admirable

example of a non-technical presentation of his subject by a doctor for laymen, or more particularly lay-women. It is written clearly and pleasantly, and if much of it appears to be the emphasis of common-sense principles, it will be agreed that it is exactly the neglect of these that provides the pædiatrician with the bulk of his work. The illustrations are well chosen and reproduced. We see the hero of this saga in his bath, breaking wind, imbibing his meals comfortably and uncomfortably, and in a number of other situations dear to biographers. We do not know how Dr. Walker would face the acid test that should be applied to all professing pædia-tricians—namely, the question "How many children have you got yourself?" but on internal evidence there is nothing to suggest a lack of sympathy with the difficulties of the harassed parent.

An Epitome of Obstetrical Diagnosis and Treatment in General Practice

By BETHEL SOLOMONS, M.D., F.R.C.P.I., F.C.O.G., Master, Rotunda. London: John Bale, Sons and Danielsson, Ltd. Pp. 138. 2s. 6d.

THE relatively small amount of information which this book contains severely limits its value. Dr. Bethel Solomons' use in some places of numbered lists and in others of a rather bleak narrative is rather disturbing. His short sentences are some-times a little obscure in meaning; he would have done well to abandon them entirely in favour of tabulated information. Moreover, valuable space is occasionally wasted by the repetition of information already given in "summing up" paragraphs which are hardly required in a book which is itself a summary.

Except in one or two places the treatment recommended is in accord with that usually practised in London. We think Dr. Solomons' advocacy of non-control of the fundus in the third stage of labour is unsound, and we are sorry to see the term sapræmia appear in the section on puerperal sepsis. On some important subjects very little help is given—notably, in the chapter on general diseases in pregnancy. The section on obstetric operations is good.

Anatomy of the Rhesus Monkey

By Nineteen Authors. Edited by CARL G. HARTMAN, Department of Embryology, Carnegie Institute of Washington; and WILLIAM L. STRAUS, Jr., Depart-ment of Anatomy, Johns Hopkins University, Baltimore. London: Baillière, Tindall and Cox. Pp. 383. 27s.

THE macaque monkey has been fated to be the victim of research in an increasing degree in the last few years, and to a less extent has been a subject for dissection in comparative anatomy rooms. Neverthe-less, so far as we know, this is the first effort to provide a comprehensive "anatomy" of the animal for the benefit of these workers. The book consists of 18 chapters, each by a different author, and covers not only the zoological status of the monkey but all the various systems which make up his body, to which Prof. Carl G. Hartman adds a chapter on housing and care. Every chapter is well and clearly written, with excellent illustrations; we hope these will be increased in number in a future edition. This is, of course, a book for specialists, but everyone working with these monkeys will find useful infor-mation therein.

Quarterly Journal of Medicine

THE July issue (Vol. III., No. 11) contains the following papers: (1) Calcinosis, by W. D. W. Brooks (London). The results of investigation of a case of this rare disease, in which calcareous deposits occur in subcutaneous and other tissues chiefly of the limbs. It appears to have a close connexion with sclero-derma, and metabolic studies on a patient with this condition are also reported. A marked tendency to calcium and phosphorus retention was revealed in the case of calcinosis, but not in that of scleroderma; and histological study of a calcareous nodule from the former suggested that the calcium was deposited in degenerate fibrous tissue.—(2) A Statistical Analysis of 389 Fractional Test-meals, with special reference to Duodenal Regurgitation, by N. F. Maclagan (London). The results are opposed to the views that duodenal regurgitation is responsible for the fall in acidity in the later stages of the test-meal, and that pyloric irritation is responsible for the climbing type of curve.—(3) The Hæmopoietic Activity of the Normal and Abnormal Human Liver, with special reference to Pernicious Anæmia, by J. F. Wilkinson and L. Klein (Manchester). Liver extracts were made from (*a*) normal human livers; (*b*) from the livers of patients with pernicious anæmia undergoing active remission and dying of other diseases; from the liver of (*c*) one partially treated case and (*d*) one untreated case of pernicious anæmia; an extract was also made from the liver of a case of poly-cythæmia rubra, and a control extract of calf liver. Tested on patients with pernicious anæmia, the extracts in groups (*a*) and (*b*) were found to be hæmo-poietically active; that in (*c*) was partially active; and that in (*d*) inactive. The extract from the liver of the polycythæmia case was unusually potent.—(4) The Alleged Pituitary Origin of the Eclamptic and Pre-eclamptic Toxæmias of Pregnancy, by F. B. Byrom and C. Wilson (London) (see p. 490).—(5) The Respiratory Exchange during Exercise in Heart Disease, by Maurice Campbell (London). The pul-monary ventilation on 16 cases of heart disease was found to be rather greater at rest, during, and after exercise than in normal subjects; also in the patients the respiration-rate was faster, and the effective alveolar ventilation formed a smaller percentage of the total ventilation. Elimination of CO_2 was less, and in spite of shallow breathing a much greater proportion of the vital capacity was called upon in the patients. This last appeared important in the production of dyspnœa.—(6) The Effects of Bodily Rest, Muscular Activity, and Induced Pyrexia on the Ventricular Rate in Complete Heart-block, by A. R. Gilchrist (Edinburgh). Investigation of a series of cases of complete heart-block showed that on exercise the ventricle was capable of substantial increase in rate in some, slight in others. A labile ventricular rate accompanied a stable auricular rate and vice versa. Pyrexia produced by protein shock also accelerated the ventricle.—(7) Massive Atelec-tatic Bronchiectasis, by W. P. Warner (Toronto). Five cases of bronchiectasis involving a whole lung are reported; all were due to atelectasis of the lung, congenital in 1 case, in 1 due to central bronchial obstruction, and in 3 due to the obstruction asso-ciated with infection. No fibrosis of lung paren-chyma, nor pleural adhesions were present in these cases; the distinctive radiograms are reproduced.—(8) The Treatment of Muscular Dystrophy with Glycine, by D. P. Cuthbertson and T. K. Maclachlan (Glasgow). Experiments are recorded on 7 cases of muscular dystrophy and 2 of muscular atrophy to determine the effect of injected glycine. There was a temporary increase in urinary creatine in all cases, and at the same time the majority benefited gener-ally and by improved power in the affected muscles.—(9) Prolonged Residence in High Oxygen Atmo-spheres, by D. W. Richards and A. L. Barach (New York) (reviewed in THE LANCET, August 18th, p. 371).—(10) Lung Abscess, with special reference to Causation and Treatment, by James Maxwell. Analysis of 315 post-mortem notes.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 1, 1934

RAIN AND STORAGE

LONDON is dependent for most of its water on two rivers, the Thames and the Lee, neither of them with very large watersheds. Nevertheless, the amount of rain that falls in any year on these watersheds would be amply sufficient to supply man, woman, and child with enough water all the year round if the rain were to fall evenly. Unfortunately, as we well know, this is not the case, and long periods of drought are not compensated by intervening periods of heavy rainfall, because the flood-water, after doing harm to low-lying crops and riverside dwellers, is allowed to reach the sea as quickly as can be arranged. The situation is described in a caustic remark from America quoted in the recent report[1] of the Metropolitan Water Board, "It soon will be four years since 'the drought of 1930' began—and it is still going strong: meantime every human effort is being put forth to shunt available rainfall off to the sea as rapidly as possible." The recent report of the Ministry of Health considers the dangers of flood in the tidal reaches of the Thames almost in the same breath as the drought higher up.

The necessity of pure water was of course not foreseen by the early settlers on the Thames estuary any more than it was in the case of the Hansa towns of North Germany which are for the most part equally badly situated for obtaining a sufficient supply. The Metropolitan Water Board is responsible for supplying a population of 7½ millions, more than equal, as HOUSTON used to say, to the combined populations of Australia and New Zealand. Each of these persons requires on the average a little more than 40 gallons of water a day, the average daily quantity of water distributed being about 293 million gallons—and still going up, for last year there was an increase of more than 28,000 in the number of premises supplied and 5 per cent. more water distributed than in the previous year. Normally of these 300 million gallons daily 200 are taken from the Thames and 50 from the Lee. The Thames should itself be sufficient for the purpose, for even last year more than 1300 million gallons of water a day passed Teddington weir; the Water Board is entitled if it wishes to take all of this except the comparatively trifling amount of 170 million gallons to keep the Pool of London flowing—and even this small obligation has been reduced to 50 million gallons in the present emergency. But the drought during the six months around last Christmas created a situation without parallel in recent times, for the rainfall was something like six inches below the average and actually only 79 million gallons passed Teddington weir on Sept. 4th and no water at all passed Feilde's weir on the Lee during two days of the same month, and only 2 millions on one December day. Obviously without some storage the position would be impossible, and it has been the policy of the Water Board since 1902 steadily to develop the storage capacity. At the appointed day in 1904 when the old water companies were amalgamated there were only the Staines reservoirs with a capacity of 3380 million gallons; Walton reservoir opened in 1907 gave another 1200 millions, King George's reservoir in 1913 more than 3000 millions, and finally in 1927 the Littleton reservoir, built two years earlier, was brought into general use, bringing up the effective storage to a total of 19,000 million gallons.

A striking illustration of the value of storage is to be found in the newly completed Sösetal dam in the Harz mountains, designed to provide a supply of drinking water for a number of important towns in the Province of Hanover, including Hildesheim and Bremen. The Harz being densely wooded and rising sharply to a height of 4000 feet out of the North German plain, induces the copious precipitation which results in devastating flooding of the river Leine, one of the large tributaries of the Weser. In January, 1932, 1500 million gallons of water fell in this small watershed within a period of 60 hours instead of so many days; 15,000 gallons per second were retained by the dam and only 700 were allowed to pass, with the result that this valley was the only one entirely unharmed by flooding. The yearly total of water entering the dam will vary in dry years (such as 1911 and 1921 were) from 6000 million gallons to 11,000 in wet years, averaging about 8000. The total content of the reservoir will be 5500 million gallons, making it possible to deliver 7000 millions in the year at a controlled rate of flow, approximately 220 gallons in the second. By keeping back flood-water and delivering a regular supply of water into the Leine, the needs of agriculture will be met all along the course of the river, while the use of the reservoir as a supply of drinking water will have no drawback, since the 2000 million gallons a year which will enter the supply pipes are no more than the flood-water which normally romps down to the sea, doing nothing but harm in its course.

These facts and figures from Hanover bring out the prime value of storage, if anyone had doubts on the point, but the advantages of storage are not exhausted by the equalisation of supply. Storage has its own virtue: It is, as HOUSTON again remarked, nature's own way of purifying water and the mere lag of water in storage reservoirs produces results of importance. The sedimentation of suspended solids carries down a large proportion of the bacteria present in the raw water; a reduction of 72 per cent. occurred last year in the Littleton reservoir. Excremental microbes are reduced by 92–97 per cent. by storage alone, and the bacteriological standard reached after filtration of the sedimented

[1] Twenty-eighth Annual Report, by R. B. Florin, deputy director of water examination. London: P. S. King and Son. 10s. 6d.

water is very high. On the other hand, storage may lead to the growth of algæ and related organisms, which clog the filter-beds, and these have not been kept entirely in check with copper sulphate. There is room here for further study of algicidal agents and indeed of the whole sequence of biological changes in river water before and after filtration. The minor problems of storage must be solved, for certain it is that only a large increase in storage capacity will prevent recurrence of the present anxious situation. If all the storage reservoirs of Thames and Lee were full there would be no more than 66·6 days' supply available. If there were a year's reserve the Water Board need not pass sleepless nights in the driest summer. The initial expense of installation would no doubt be great, but the running cost need not go up materially, and London would regain its position of premier city in the provision of healthy amenities. Moreover, every gallon of water stored in flood-time would benefit the riverside dwellers.

REGIONAL BLOOD PRESSURES

MORE and more interest is being taken in the peripheral circulation, not only in the limbs but also in the viscera. It is now recognised that there are peripheral vasomotor centres, which act apparently in independence of the heart and big vessels, and it has also become clear that the venous system plays an important part in the general circulation. In these circumstances dissatisfaction is often expressed with the present methods of measuring blood pressure, and it is realised that false conclusions may sometimes be drawn if readings from the brachial artery are taken as a guide to the state of the general cardiovascular system. It has been pointed out [1] that the pressure in the two arms may differ by as much as 10 mm. systolic and 5 mm. diastolic; E. J. STIEGLITZ and D. W. PROBST found differences of this kind in 15 per cent. of cases, and concluded, with justice, that no single reading from one arm could be considered satisfactory. Recently BRODIN and JOSEPH [2] have examined and compared the arterial tension in the legs and arms of elderly people, using a Pachon's manometer, and here again a good deal of variation has been found between the two sets of readings, the systolic pressure in the lower limbs being higher than in the upper. At the Mayo Clinic another significant inquiry on similar lines has been made by VOLDENG,[3] who has investigated the feasibility of ascertaining clinically the blood pressure in arteries of different sizes in the same subject. In normal persons of various ages mean pressures were estimated in the brachial artery, in a digital artery, in an arteriole, and in a capillary. In this normal group he found stability of the blood pressure gradient even when the effects of cold air and cold water, warm air and warm water were tested. On the other hand, when similar observations were made on ill people—including cases of essential hypertension, arterio-sclerosis, polycythæmia, and anæmia—much variation was noted. For example, in essential hypertension the resistance was found to be mainly in the arterioles; whereas in severe generalised arterio-sclerosis, although raised in the larger vessels, the pressure was actually below normal in the arterioles and capillaries. In polycythæmia the pressure in the minute vessels was found to be much reduced and it tended to return to normal as the condition of the blood improved under treatment.

It is clear again from all this work that estimates of the brachial pressure alone do not necessarily give adequate information about conditions elsewhere in the vascular tree. Prof. VILLARET, Dr. JUSTIN-BESANÇON, and Dr. CACHERA have pressed this conclusion even further, and have shown "the existence of relative autonomy of the several circulatory sectors and their mutual independence of each other, permitting simultaneous regional conditions to occur in which the blood pressure is very different." Their observations and deductions, as published in our present issue, are of no little importance in the way they bear on some of the problems of medicine, especially those associated with an arterial spasm and shock. And although they do not regard our present methods of estimating blood pressure as valueless, it is impossible to read their paper without realising that these methods leave much to be desired. The time can hardly be far distant when we shall look back on them as regrettably crude.

LESS NOISE

SINCE last Monday motorists in London have been forbidden, on penalty of forty shillings, to sound their horns after 11.30 P.M. within five miles of King Charles's statue at Charing Cross. This is the latest result of an agitation that has been going on now for some little time: in Queen ELIZABETH'S reign street noises, including horn-blowing, were forbidden in London at night on pain of imprisonment; a hundred years ago the inhabitants of a city church were complaining that the noise of stage coaches drowned the voice of the preacher. No one will readily believe, however, that the auditory sufferings of our forbears were anything to be compared with our own, and Dr. KINNIER WILSON reflects the general opinion when he says that noise "is noisier to-day than it used to be—much." [1] There is as yet no proof, he admits, that even so it is really producing neurosis; indeed it is clear that on the whole people suffer from noise because they are nervous—not suffer from nervousness because of the noise.[2] Nevertheless there are certainly such things as vicious circles, and there seem to be many weaker brethren to whom noise is an abounding source of irritation. Moreover, it has no countervailing advantage to justify its infliction on the sick and sensitive; and when the secretaries of hospitals are protesting right and left about the din outside their wards the time has undoubtedly come to

[1] See THE LANCET, 1932, ii., 1287.
[2] Brodin, P., and Joseph, R.: Bull. et mém. Soc. méd. hôp. de Paris, July 9th, 1934, p. 1139.
[3] Voldeng, R. E.: Proc. Staff Meet. Mayo Clin., 1933, viii., 535.

[1] THE LANCET, 1934, i., 531. Republished in the Preventive Aspects of Medicine, London, 1934, p. 229.
[2] THE LANCET, 1932, i., 995.

deal with a genuine nuisance. Any sound made by somebody else is liable of course to be regarded as objectionable; but there are many which the majority will agree to condemn as excessive or inappropriate, and the Minister of Transport's experiment on nocturnal horn-blowing is pretty generally welcomed. If the results of similar steps in Paris and other continental cities are any guide the silent zone in London is likely to be a success and we may look forward to similar arrangements in other parts of the country.

A second step which the Ministry has taken is the formation of a traffic noise committee with very wide terms of reference. Its personnel includes Sir HENRY FOWLER, a past president of the Institute of Mechanical Engineers, who will be chairman, and Mr. G. W. C. KAYE, D.Sc., and Mr. H. F. GOUGH, F.R.S., of the National Physical Laboratory at Teddington, the resources of which are to be placed at the committee's disposal by the Government. In a broadcast address on August 23rd the Minister said his object in appointing the committee was to discover the means of manufacturing motor vehicles with as silent a mechanism as possible so that noisy machines would no longer be allowed on the road. Though there are few people who would object to the average motor-car of to-day on the score of noise, a strong indictment can be framed against the average motor cycle and what is termed the sports car. The committee will clearly find plenty of material to work on if it wants to earn the gratitude of those who live on the King's highways, and the new acoustical laboratories at Teddington seem to have been erected at just the right moment. The National Physical Laboratory has for some years given close attention to the problems of measuring and abating noise, and it appears that while a noise may have several disturbing features, the actual loudness may be measured by both subjective and objective means. This is of importance because the adoption of standards of noise may have to be envisaged by the committee. Its composition should enable representatives of science and industry jointly to tackle such problems as inefficient silencers, engine noise, excessively loud or offensive hooting, the "revving up" of cold engines, and unsuitable street paving.

The action of the Ministry of Transport reflects a growing public sensitiveness to noise—a sensitiveness which has found expression in the birth of the Anti-Noise League of which Lord HORDER is president. The League is to interest itself in much beyond disturbing sound on the roads; it is not above considering banging doors, aeroplanes, or wireless loud-speakers. In all these directions there is much to be done. From the scientific standpoint, however, the most constructive work on noise and its effects has been in relation to industry, and particularly useful data may be found in two studies published by the Industrial Health Research Board.[3] One of these suggested that even after years in a noisy environment the worker does not become completely adapted or acclimatised to noise, but goes through the process of adaptation daily. The other, by Mr. K. G. POLLOCK and Prof. F. C. BARTLETT, F.R.S., while concluding that the psychological and physiological effects due directly to loud noise have been greatly exaggerated, agreed that in general it is prejudicial to efficiency, and found that its harmfulness is roughly proportional to the difficulty of the work on hand.

[3] Report No. 65. London: H.M. Stationery Office, 1932. See THE LANCET, 1932, ii., 692.

BRITISH ASSOCIATION AT ABERDEEN

THE 103rd meeting of the British Association for the Advancement of Science opens at Aberdeen on Wednesday next with a presidential address in the Capitol cinema by Sir JAMES JEANS, entitled "The New World-picture of Modern Physics." An evening discourse in the MacRobert Hall on the following Monday on the Storage and Transport of Food, by Sir FRANK SMITH will take the form of a memorial lecture for Sir WILLIAM HARDY, who was president of the Association at the date of his death in January last. The proposed evening symposium on the general relation between science and the community has dropped out of the programme, and there will be no set general discussion on this topic, but anyone who gives even a casual glance at the programme of the meeting must become aware of the extent to which the Association is becoming an effective mediator between science and the public. The sectional presidential addresses are particularly designed to this end, and as we have already announced some of them bear closely on matters related both to the student of medicine as well as to the student of life in general. Prof. H. E. ROAF on colour vision, Dr. SHEPHERD DAWSON on psychology and social problems, Dr. E. S. RUSSELL on the study of behaviour, are all good evidence of this. Those who would listen to experts discussing some of the more engrossing scientific problems of the moment may attend on Friday in the section of chemistry a discussion on ascorbic acid (vitamin C), or in the combined sections of physiology and agriculture a symposium on nutrition in relation to disease. On Monday those interested in water—and who is not?—must choose between a discussion on underground water-supply, in the section of geology, and a symposium on bacteriological problems of fresh water, in the combined sections of zoology and botany. Similarly, on Tuesday morning a choice must be made between a discussion on the chemistry of milk (chemistry and agriculture combined), one on the interpretation of animal behaviour (zoology and psychology combined), and a symposium on food preservation (physiology). Probably many of those who visit the meeting for social comradeship and quiet study will want to hear Sir HENRY FOWLER'S summary on Monday morning of the report of a committee on the reduction of noise, and even to take part in the afternoon excursion to the Bridge of Dee for a demonstration of successful reduction of the exhaust noise from the motor bicycle.

ANNOTATIONS

ECLAMPSIA AND THE PITUITARY

THE intermediate lobe of the pituitary gland secretes a hormone, or a mixture of hormones, known as vasopressin, which exerts two very characteristic pharmacological effects—namely, vasoconstriction and postponement of the excretion of water but not salt through the kidneys. The effect of lack of this hormone, or at least of its antidiuretic moiety, is seen clinically in the picture of diabetes insipidus. Yet the clinical counterpart of excessive secretion of vasopressin, which surely must occur, has never been defined. If a pharmacologist were invited to speculate on the probable nature of this imaginary syndrome, he might well predict a rise in blood pressure and a tendency towards an accumulation in the tissues of œdema-fluid which would be rather poor in salt. In extreme cases he might foresee a degree of vasoconstriction intense enough to cause focal ischæmic necrosis in various organs. Furthermore, knowing that pituitrin combined with a high water-intake can cause convulsions in normal animals and precipitate fits in epileptic subjects, he might also anticipate convulsions. In other words, he might postulate a syndrome which would tally fairly closely with the pre-eclamptic and eclamptic toxæmias of pregnancy. It is not surprising then that the idea that these toxæmias are due to overactivity of the pituitary —by no means a novel one—is attracting considerable attention at a time when new facts about that gland are coming to light almost every week, and if the hypothesis can be translated from speculation to demonstrated fact most of the mystery surrounding eclampsia will vanish.

Such direct evidence as has so far accumulated is not entirely convincing. Prof. Harvey Cushing's [1] recent observation that the posterior lobe of the pituitary is invaded by basophilic cells from the more anterior parts of the gland in eclampsia is suggestive, but unfortunately he found the same change in two normal control glands. Many attempts have also been made to isolate pressor substances from toxæmic blood, but the technical difficulties are great, the results obtained have been equivocal, and a pressor effect is by no means peculiar to pituitary extracts. On the other hand, the antidiuretic property of pituitrin is unique, for no other known pharmacological agent will suspend excretion of water while allowing free passage of salt through the kidney. For this reason the statement of K. J. Anselmino and F. Hoffman [2] that ultrafiltrates derived from toxæmic blood cause postponement of diuresis when injected into rabbits is of considerable importance. These workers claim to have demonstrated that toxæmic blood contains a principle identical with vasopressin, in concentrations ranging from 0·002 to 0·008 units of pituitrin per c.cm. and depending on the severity of the clinical manifestations. F. B. Byrom and C. Wilson [3] have recently attempted to confirm these conclusions, but without much success. Finding that they were unable to obtain consistent results with rabbits, they employed instead a method devised by J. H. Burn [4] for the quantitative assay of the antidiuretic principle, in which the rat is used as the experimental animal; and their first step was to justify this change in technique by demonstrating that the rat method was sensitive enough to reveal the presence of pituitrin in the minimum dilution mentioned above. They then performed 38 experiments with ultrafiltrates derived from blood in 13 cases of toxæmia, but found evidence of vasopressin in only four instances, as compared with five instances in a control series of 44 experiments in which normal ultrafiltrate or saline was used as the test solution. Byrom and Wilson conclude that if an excess of pituitrin is present in the blood in eclampsia its concentration is considerably lower than Anselmino and Hoffman suggest. This does not necessarily imply that the pituitary hypothesis of eclampsia is untenable, but it suggests that further evidence is urgently needed before the hypothesis can be accepted as proven.

[1] Amer. Jour. Path., 1933, ix., 539.
[2] Klin. Woch., 1931, x., 1438.
[3] Quart. Jour. Med., 1934, iii., 361.
[4] Quart. Jour. Pharm. and Pharmacol., 1931, iv., 517.

APTITUDE TESTS FOR MEDICAL STUDENTS

FOR some years a Committee of the Association of American Medical Colleges has been experimenting with tests for picking out those applicants who have the ability to complete successfully the medical school course. The form of the test as at present used includes seven parts: (1) comprehension and retention; (2) visual memory; (3) memory for content; (4) logical reasoning; (5) scientific vocabulary; (6) ability to follow directions; and (7) understanding of printed material. During the past year it was applied to as many as 9000 students. A detailed study of the results of this work has been made, and was presented by the secretary to the committee, Dr. F. A. Moss, at the forty-fourth annual meeting of the Association held in Rochester and Minneapolis in 1933.[1] A considerable degree of correlation is shown between success in the aptitude test and success in the medical schools. For instance, in the school-year 1929–30 the test was given to some 5000 freshmen medical students. Of the 10 per cent. who made the highest scores in the test no man failed to graduate and their average medical school grade was 86·0 for the four years' course. Of the 10 per cent. who made the lowest scores in the test, 54 per cent. failed to graduate (40 per cent. failed in the first year), and their average grade for the four years was only 71·4. On the other hand, these tests resemble those developed by industrial psychologists for detecting the accident-prone, in that while they are successful in broadly separating the sheep from the goats they cannot be confidently relied upon to place every individual in the right category. The correlation between success in the test and success in the medical school is certainly not absolute, or anything approaching the absolute. The more serious discrepancies—students who score highly in the test and do poor medical school work, and students who fail at the tests but succeed in the schools—have been specially examined by Dr. Moss. By a questionnaire addressed to the deans of various medical schools he sought to discover whether personal factors were the responsible agents. The chief reasons advanced for the unexpected failures were ill-health, financial worries, too little study, or too many outside interests. Even the best aptitude tests must "gang aft agley" when the would-be physician is "a 'play boy' with many love affairs," or is unable to resist the "social distraction" of the athletic team; while "incompatibility with certain professors" was too much of a handicap to one. The unexpected successes, on the other hand (those

[1] Published in the Journal of the Assoc. of Amer. Med. Colleges, March, 1934.

who did badly in the test), were composed mostly of hard workers—the "plugger type" Dr. Moss calls them—together with students of "particularly pleasing personality" or with "close relatives who are physicians." Perhaps in future the aptitude tests might award a few extra marks for these latter characteristics leading to unlooked-for success! Thus, although the test may be of considerable use in eliminating undesirables, yet so long as some men who do badly in it do creditable work in the schools, it is difficult, as Dr. Myers of Indiana University points out, to "convince fathers and mothers, who are interested in having their sons accepted, that this test should be used in accepting or rejecting students." Dr. Moss rightly emphasises that such a test, even if much improvement in it is found possible, can be only one criterion in selecting medical students.

THE INCISION IN APPENDIX OPERATIONS

THE various ways of approaching the diseased appendix, and the various objections to them, are reviewed by E. H. Fiske and H. E. Rhame,[1] who point out that an ill-planned incision may cost the patient his life. The methods of exposure may conveniently be divided into (1) those in which the rectus sheath is opened by a vertical incision, with retraction of the muscle inwards or outwards as necessary, and (2) abdominal section, either oblique or transverse, lateral to the outer edge of the sheath. Fiske and Rhame condemn the rectus incisions: first because they permit of only an indirect approach to the appendix through uncontaminated tissues, and encourage excessive handling of the intestines; secondly because the drainage they allow must often be against gravity; and thirdly because they leave a scar at right angles to the line of skin cleavage, and cause injury to vessels and nerves, all of which increases the liability to post-operative hernia. With the lateral incisions, on the other hand, although many of these objections are obviated, the exposure tends to be incomplete. The incision they themselves have planned is one that allows of almost indefinite extension, either medially or laterally, depending on the findings at operation. It is slightly oblique, somewhat in the position of McBurney's, but the muscles are not split in the fashion of the gridiron. It starts from a point midway between the umbilicus and the symphysis pubis and at the outer third of the rectus, and passes obliquely outwards and upwards two fingers-breadth above the anterior superior spine—running parallel with, and one finger's breath above, the iliac crest. The external oblique aponeurosis is divided in the direction of its fibres, and the incision carried down through the internal oblique; the transversalis is split in its line of cleavage and retracted; the transversalis fascia and the peritoneum are then cut in the line of the previous incision. If necessary the incision can be carried as far laterally as the reflection of the peritoneum on to the ascending colon. Medially the fibres of the external oblique muscle can be divided by an extension of the incision in the aponeurosis, or the rectus sheath can be opened, allowing inward retraction of the rectus muscle. By vertical incision up or down the rectus sheath even wider exposure may be secured. Its authors claim that by using this incision they have lowered their operative mortality, and have also much decreased the incidence of hernia. It is unlikely, however, that surgeons in general will agree with all the premisses of the argument against the more usual methods of access. When the diagnosis of an inflamed retrocæcal or retrocolic appendix is assured, the incision must of course be made with a view to easy exposure of the outer side of the cæcum; but does not the lateral rectus incision of Battle ensure such an exposure? There do not seem to be any very good grounds for the great fear of hernia following its use, which is felt by Fiske and Rhame. The original gridiron opening did perhaps give an unduly small exposure, but as employed by many surgeons to-day it can be extended considerably at either extremity. The incision to the inner side of the rectus sheath is also popular still with many operators, although here it must be allowed they have to count on anæsthesia deep enough to render outward traction of the rectus muscle easy, and may have to make a fresh one for lateral drainage. Where special difficulties are anticipated in the operation, or where postero-lateral extension is likely to be helpful, the incision suggested by Fiske and Rhame is one to consider.

[1] Amer. Jour. Surg., July, 1934, p. 19.

CARDIAC SYMPTOMS OF ANXIETY

IT has long been recognised that cardiovascular symptoms readily arise in the absence of organic heart disease. Such symptoms have been studied more particularly in war time, and have received the name of "irritable heart of soldiers" (Da Costa, 1871), disordered action of the heart, and effort syndrome. In the United States the term neurocirculatory asthenia is favoured because it is non-committal, and the condition thus defined is distinguished on the one hand from organic heart disease, and on the other from psychoneuroses as such, in which anxiety, hypochondria, or hysteria predominate. Of true neurocirculatory asthenia, as thus circumscribed, the principal symptoms are palpitation, shortness of breath, precordial pain or discomfort, and exhaustion. The borderline between normal and abnormal is ill-defined, but "neurocirculatory asthenia may be said to be present when the symptoms appear during such customary physical activities and excitements of daily life as previously caused no symptoms or which in the average person produce no symptoms." This quotation is taken from a paper in which Dr. Henry C. Craig and Dr. Paul D. White analyse 100 cases,[1] and further particulars may be found in a study of the condition in its relation to organic heart disease, which Dr. White has written in collaboration with Dr. Joseph C. Edwards.[2] As in former papers he draws particular attention to the sighing respiration often complained of; indeed, "sighing respiration and precordial tenderness," he says, "are almost pathognomonic of neurocirculatory asthenia."[1] Dr. Doris Baker reported on this symptom in our columns not long ago,[3] and it has also been studied for some years by Dr. C. K. Maytum and Dr. F. A. Willius[4] at the Mayo Clinic. These last workers point out that the "sighing" may be so pronounced as to wake the patient from an apparently sound sleep—a possibility that should be kept in mind when considering nocturnal dyspnœa. They also describe attacks of panting respiration in which the rate of breathing may reach 100 a minute, and manifestations of tetany may develop through over-ventilation of the lungs.

These and other symptoms of "neurocirculatory asthenia" might strongly suggest the presence of true

[1] Arch. Internal Med., 1934, liii., 633.
[2] New England Jour. Med., July 12th, 1934, p. 53.
[3] THE LANCET, 1934, i., 174 and 198.
[4] Proc. Staff Meet. Mayo Clin., May 23rd, 1934, p. 308.

cardiovascular disorder, but once recognised they require altogether different management. Though often terribly distressing to the patient, they are to be looked on primarily as expressions of underlying states of anxiety; and if they can conveniently be distinguished from psychoneuroses, as Craig and White suggest, it is only because a particular group of symptoms has become particularly conspicuous—because the past has obscured the whole.

FERTILITY AND CONTRACEPTION

To what extent is the excess fertility of the poorer classes due to ignorance of the modern technique of birth control? When women who practise no method of contraception are selected from among the general population the pregnancy-rates (defined as the number of pregnancies per 100 computed ovulations) are found to be substantially similar in all economic classes. Among white women the very poor class has nearly the lowest mean pregnancy-rate and the wealthy class has the highest mean pregnancy-rate. This conclusion, biologically reasonable yet contrary to most preconceptions, is one that emerges from a report [1] by Raymond Pearl of research undertaken in the department of biology of the Johns Hopkins School of Hygiene with aid from the Milbank Memorial Fund. The Fund has previously published [2] an estimate of the efficacy of contraceptive methods as ordinarily practised in America. Dr. Pearl has detailed records of 30,951 cases of which 6000 have thus far been tabulated. Of these 4945 pertain to married women living in wedlock, and only these are considered in the present report. The data analysed represent 14,666·6 "person years of exposure to risk of becoming pregnant" among white women and a smaller experience for negro women. The general picture, writes Dr. Pearl, is of a state of affairs where a high proportion of the economically most fortunate classes are practising contraception with a relatively high degree of precision and intelligence, producing mainly only as many babies as they want and when they want them. He concludes that free dissemination of reliable contraceptive information would bring the differential fertility of social classes more nearly into balance. As to whether this is a desirable result he expresses no opinion except to point out that a concomitant result might well be an alleviation of the social burden of poverty and unemployment.

EVIPAN ANÆSTHESIA IN SWEDEN

AT a hospital in Varberg Dr. Anders Westerborn [3] has, since the spring of 1933, had an experience of 500 narcoses under evipan sodium. His verdict is on the whole favourable, not to say enthusiastic. In as many as 350 cases major operations on the abdominal viscera were undertaken, and it would seem that evipan anæsthesia is calculated to play a much more important part in major than in minor operations; for the latter there are still attractive alternatives. It has been objected that anæsthesia induced by intravenous injection is an irreversible process; a drug thus introduced cannot be withdrawn at will. In the case of evipan, however, it is possible to administer small quantities at short intervals, not according to a fixed scheme of dosage regulated in advance by the patient's age, weight, and general condition, but by signs of returning consciousness. The anæsthetist who practises this system of administration is to all intents as much master of the situation as he is when administering an anæsthetic by inhalation. Another virtue of this piecemeal system of administering evipan is the scope it allows for individualising. Dr. Westerborn is impressed by the quantitative differences in the reactions of patients to this drug, and he refers to two patients, of the same age and sex, undergoing the same abdominal operation which required approximately the same time; one took 4 c.cm. of evipan, the other 15 c.cm. As was to be expected, able-bodied men of 20 to 30 needed much more than elderly, anæmic, or otherwise debilitated patients; healthy young males were, in fact, the least satisfactory group of patients as they were subject to a phase of post-narcotic excitation. This sequel was observed in a score of cases, and was so serious in four or five of them that the nurse in attendance had some difficulty in keeping the patients in bed. A man of 45, who had been given 19 c.cm. of evipan for resection of the stomach lasting an hour and three-quarters, became so violent that he needed two nurses to restrain him; and when, an hour later, signs of an internal hæmorrhage necessitated blood transfusion and relaparotomy, it was found that a ligature had slipped off a vessel in the omentum. The arrest of the hæmorrhage was followed by recovery, but the incident gave everybody concerned an anxious time. Dr. Westerborn has no anæsthetic deaths to deplore. He is inclined to attribute the few evipan deaths hitherto recorded to the over-dosage liable to occur when a large single dose is given. With the tentative system of dosage he employs, he considers evipan as one of the safest of general anæsthetics.

THERAPEUTIC PNEUMOPERITONEUM

THE student who learns that bilateral simultaneous artificial pneumothorax has often been employed in the treatment of phthisis, and that even bilateral thoracoplasty is at times attempted, might well feel that the resources of collapse therapy must now be exhausted. Nevertheless, yet another application of the pneumatic principle has recently been recommended, and pneumoperitoneum must be added to the various remedies whose story will arouse the admiration of the medical historian of the future. Pneumoperitoneum was designed for the relief of intestinal tuberculosis, and Andrew L. Banyai [1] claims that this method has afforded relief to over 70 per cent. of a group of sufferers from this distressing complication, all of whom had been given medical treatment without appreciable benefit. The number of his patients treated by pneumoperitoneum has now reached a total of one hundred, and further experience of the method has only confirmed his good opinion of it as a therapeutic measure. The results are said to depend on secondary hyperæmia induced by the oxygen, which is the gas employed. Diarrhœa is reduced, abdominal pain lessened, "an immediate euphoria" is experienced, and "the psyche is also favourably influenced." The immediate euphoria is the more remarkable because apparently it has to overcome the shoulder pain, the hypochondriac tightness, and abdominal discomfort which supply the evidence that a "properly performed pneumoperitoneum" has been accomplished. But the benefits obtained from this method are apparently not confined to the abdominal cavity, and it is claimed that it may be suitably employed as an adjuvant to a phrenic nerve-block, and that a combination of these two procedures may result in a maximum

[1] Second Progress Report on a Study of Family Limitation. Milbank Memorial Fund Quarterly, July, 1934, p. 248.
[2] THE LANCET, 1934, i., 480, 694.
[3] Nord. med. Tidskr., August 4th, p. 997.

[1] Amer. Rev. Tubero., 1934, xxix., 603.

elevation of the diaphragm and a more satisfactory pulmonary collapse. Pneumoperitoneum is also suggested in support of artificial pneumothorax when basal adhesions are preventing an adequate collapse of a lower lobe.

The graver complications of pulmonary tuberculosis are so distressing that no method of treatment, however strange, should be lightly dismissed as worthless, but though operations of this nature may bring a measure of relief to some incurable consumptives, euthanasia might be more surely and more comfortably attained by simpler means. Though in skilled hands a pneumoperitoneum may be induced without serious danger in selected cases, its general employment would entail risks and might add to sufferings already sufficiently great.

GAIN IN WEIGHT ASSOCIATED WITH MENSTRUATION

WATER enters so intimately into every activity of the cell that alteration of almost any physiological variable is accompanied by either gain or loss of body fluid. It appears from a paper by J. S. Sweeney [1] that menstruation offers no exception to this general rule. He noticed that an obese patient who was losing weight steadily on a reducing diet suddenly gained 7 lb. in 48 hours shortly before the onset of menstruation. As soon as the menstrual flow appeared the extra weight was equally quickly lost. Sweeney proceeded to make observations on the body-weight in 42 normal adult girls and found that some 30 per cent. gained 3 lb. or more in weight before or during menstruation. The gain in weight was in some cases associated with thirst and with perceptible diminution in the output of urine, and there is little doubt that water retention was responsible. This phenomenon apparently accounts for the feeling of tightness in the extremities which often accompanies menstruation, and in a few cases pitting œdema has actually been demonstrated. The cause of these interesting fluctuations in water balance is at present unknown. The problem may be related in some way to the obscure œdema which appears in otherwise healthy adolescent girls, and possibly also to the pre-eclamptic toxæmias of pregnancy.

THE BLOOD ALCOHOL IN ACCIDENT VICTIMS

LEGISLATION has been passed enabling courts to deal severely with motorists who over-indulge in alcohol, but the possibility of an accident being caused by the drunkenness of the injured party is rarely mentioned. Nevertheless, anyone who has had charge of a casualty department knows that it is not uncommon for accident victims to be suffering from alcoholic excess, and it seems fair that this cause of accident should be given proper weight. Inquiry has been made into this subject in Sweden especially, and Drs. James Hindmarsh and Paul Linde have lately given an account [2] of an investigation of all the accident cases admitted to the surgical division of the Maria Hospital in Stockholm over a year. They used Widmark's method of estimating the alcohol content of the blood—one which has shown itself to be accurate within limits of ±0·03 per 1000—and they tested only cases brought to hospital within five hours of the accident. The numbers were 283 men and 103 women; of these, 41 per cent. of the men and 10 per cent. of the women gave positive reactions. Most of the women had very small percentages of alcohol in the blood, but the bulk of the men had over 1 in 1000. The incidence was greatest on Saturdays, but nearly as large on Wednesdays and Fridays. The bulk of the accidents were made up of collisions between motor-cars and pedestrians and of motor-cycle accidents. Half the lorry drivers and pedestrians injured, but only a third of the motorists and motor-cyclists, had alcohol in their blood. These figures bear out what many observers have suspected—that the pedestrian is by no means always a blameless victim of the motorist. The law of this country does not yet allow to a defendant motorist "discovery" of the blood alcohol of a plaintiff pedestrian at the time of the accident; but, if it did, less might be heard of the wrongs of injured foot-passengers.

[1] Jour. Amer. Med. Assoc., July 28th, 1934, p. 234.
[2] Acta Chir. Scand., 1934, lxxv., 198.

MELBOURNE MEETING OF THE B.M.A.

IT is now announced that Sir Richard Stawell, consulting physician to the Melbourne Hospital and the Melbourne Children's Hospital, will preside over the annual meeting of the British Medical Association which commenes on Sept. 9h, 1935. Thect presidents of sections are: medicine, Lord Horder; surgery (including urology), Sir Thomas Dunhill; obstetrics and gynæcology, Dr. J. S. Fairbairn; radiology and radiotherapeutics, Dr. A. E. Barclay; diseases of children, Dr. Robert Hutchison; neurology and psychological medicine, Prof. Edwin Bramwell; orthopædics, Prof. E. W. Hey Groves; oto-rhino-laryngology, Mr. Francis Muecke; pathology and bacteriology, Prof. A. Murray Drennan; dermatology, Dr. J. M. H. Macleod; medical sociology, Dr. E. K. Le Fleming; ophthalmology, Dr. A. J. Ballantyne; pharmacology, therapeutics, and anæsthesia, Sir William Willcox; public medicine, Sir Henry Gauvain, who will also preside over the section which concerns itself with the development of medicine in Australia—an interesting history.

THE CHINESE PLAN OF PAYING THE DOCTOR

IT is often said that the Chinese method of paying the doctor is to remunerate him beforehand, when he works to preserve the health of the subject, while, if he fails to preserve it, he deals with events gratuitously, i.e., he regards the consequent treatment as the work for which he has already been paid. This statement is frequently made, and happens to have been made prominently this week; it is sometimes endorsed and sometimes contradicted, while latterly, with fuller comprehension of what contract service implies, it has been asked whether such a plan does not constitute a form of insurance. When the matter was last being discussed we turned for information to Dr. Wu Lien Teh, part author of a recent and voluminous history of Chinese medicine and the well-known director of the National Quarantine Service of China. His reply shows that a categorical answer on all points is not quite easy. He writes: "I have tried to obtain something definite from ancient books like 'Chou-li.' The only certain thing I find is that during the Chou-li dynasty state examinations were held regularly for medical practitioners and that grades were given to four classes according to the percentage of cures effected by them. Since then medical practice in China has varied in many directions, but although different conditions prevail it may be said with fair accuracy that many families pay their doctors regular sums annually for their services; and this may be taken to mean that the doctors are paid to keep the families well, for no extra payment is made for attendance upon the sick. In some cases the practitioners are

called in when members of such a family fall sick and if these get well the bills are sent in and duly paid. If they die as a rule the bills are not sent in. This accounts for the statement that doctors get paid while members of the family are well and not while they are sick; but the real fact is that the doctors are paid if the patients get well but not if they die." Thus it will be seen that there is substance for the popular statement of the position, while the method of remuneration is a variant of the insurance system. Dr. Wu Lien Teh closes an interesting letter with a reference to the steady publication from his bureau of the National Quarantine Service Reports, and registers his belief that medical work in China is progressive in spite of troubled political conditions.

WEST LONDON HOSPITAL: PROPOSED MEDICAL SCHOOL FOR WOMEN

As was briefly announced in the Students' Number of THE LANCET last week a scheme for establishing a school of medicine for women at the West London Hospital is under consideration. For many years there has been a post-graduate medical college at the West London Hospital, but the approaching centralisation of post-graduate medical instruction at the new British Post-Graduate Medical School at Hammersmith has suggested to the medical staff of the West London Hospital that their activities might be more usefully directed. It is well known that the facilities for the instruction of women students in clinical medicine and allied subjects are insufficient for the present demand, and it seems an excellent idea for one more London hospital to give opportunities to women undergraduates. The proposal has not yet received the sanction of the board of the hospital, nor has any official approach yet been made to the University of London in whose province the activities of such a school would lie. The whole question is being given very careful consideration, but the announcement in the public press was premature, and no official statement has been made. The publicity given to the idea, however, should obtain both for the medical staff and lay authorities of the hospital practical arguments for the support of the scheme; and the more it is remembered that it is embryonic the more is it clear that suggestions will have a wide range within which to operate.

LEAD POISONING AND ITS RECOGNITION

OF late years there has been a revival of interest in lead as a poison. Not only have its clinical effects been reinvestigated but it has been suggested as a cause of various unexplained diseases—including, for example, nephritis in children [1] and eclampsia.[2] An understanding of the way in which the poison behaves depends on accurate means of discovering the metal and estimating its quantities in tissues and excreta. Prof. B. Behrens, of Berlin, has lately published [3] conclusions which he bases on a method of estimation devised by H. Fischer. None of the ordinary methods are, he holds, capable of giving trustworthy information about the very minute quantities of lead that one can expect to find in doubtful cases of chronic poisoning. In his experiment Behrens has used the radio-active form of the metal which enables him to estimate exactly quantities as small as 0·0001 mg. He is impressed by the fact that very little is absorbed of any given dose administered by mouth; once taken up by the red blood-cells, however, lead is readily passed on to the tissues, and the bones especially form a depôt where it remains. Excretion, through intestine or kidney, is very slow, and the result is that years after absorption has ceased large deposits may remain in the bone and by suitable measures may be recovered from the fæces. In a paper on lead poisoning in children which appeared in our columns about a month ago, workers at the London Hospital [4] described a case in which the lead was found in the fæces after injection of parathyroid extract—a procedure whose use in this connexion we owe to Donald Hunter and J. C. Aub. Parathormone mobilises the lead in bone, just as it mobilises calcium, and thus increases the amount excreted, and it may be employed in this way, for diagnostic purposes, wherever there is a suspicion that stunted growth, renal rickets, or other abnormality is due to the action of lead. As was first demonstrated by Park [5] in 1930, characteristic appearances can also be recognised—at any rate in advanced cases—on radiographic examination. In illustrating their paper with radiograms showing these appearances, Dr. Jupe and his colleagues pointed out that very few cases of poisoning in children have been reported in England; and they must be right in thinking that others would be recognised if practitioners were more closely on the watch and could apply the proper methods of detection.

[1] See THE LANCET, 1934, i., 1014.
[2] Ibid., p. 1397.
[3] Deut. med. Woch., 1934, lx., 890.

THE British Pharmaceutical Codex, 1934, is to be published on Sept. 28th.

Sir George Newman has been appointed to serve for a further five years as a Crown nominee on the General Medical Council.

Dr. James Collier will deliver the Harveian Oration before the Royal College of Physicians of London on St. Luke's Day, Thursday, Oct. 18th, at 4 P.M., his subject being Inventions and the Outlook in Neurology.

Sir George Seaton Buchanan has been appointed Master of the Society of Apothecaries for 1934-35. Sir William Willcox and Dr. J. S. Fairbairn again serve as senior and junior wardens.

WE regret to announce the death on August 24th, after a short illness, of Dr. Eric Danvers Macnamara, consulting physician for psychological medicine at Charing Cross Hospital, and a psychiatrist of great experience and insight.

THE theatre has obviously been at some pains of late to become better acquainted with the medical profession—at work, at play, and at the bar of judgment. Those of the profession who wish in turn to learn something of the theatre (not of acting alone but also of stagecraft and playwriting) are invited to join the autumn courses which are being arranged at the Everyman Theatre, Hampstead, by the Little Theatre, Citizen House, Bath. Details of the enterprise will be found in our advertisement columns.

[4] Rodgers, T. S., Peck, J. S., and Jupe, M. H.: THE LANCET, July 21st, 1934, p. 129.
[5] Park, E. A., Jackson, D., and Kajdi, L.: Amer. Jour. Dis. Child., 1931, xli., 485.

TRAFFIC ACCIDENTS AT WALSALL.—It is officially stated that one reason for the heavy pressure upon Walsall General Hospital (which is being enlarged) is that the town stands highest but one on the list for street accidents n towns with populations exceeding 100,000.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XVI.—PROGNOSIS OF ACNE VULGARIS

ACNE VULGARIS is so well known as hardly to require definition, but perhaps one should say that it is a disease of adolescents and young adults of which the characteristic lesions are comedos, papules, and pustules, that it occurs commonly on the face, back, and chest, where it frequently leaves scars, and that the acne bacillus is found in the lesions with or without accompanying staphylococci.

DIFFERENTIAL DIAGNOSIS

Before discussing its prognosis it will be as well to make clear the limitations of the subject. The term acne vulgaris does *not* include acne rosacea, better termed simply rosacea, which is a disease of middle life nearly always associated with digestive disturbances and only secondarily affecting the sebaceous glands. Neither does it include acne necrotica (acne frontalis), which is probably a staphylococcal infection of the hair follicles of the forehead and scalp, and sometimes of the back; acne scrofulosorum, better termed papulo-necrotic tuberculide; noracne agminata, which some hold to be the same as acne scrofulosorum. The grouped comedones of infants are typically acneiform in appearance but contain no acne bacilli, only spores of Malassez and staphylococci. This condition seems always to be brought on by external irritation or infection—e.g., by the application of camphorated oil or "Russian" tallow to the chest, or contact of the child's head with a dirty greasy cap, or the dirty greasy clothes of the mother. It does not come under the heading of acne vulgaris. Other conditions which are apt to be confused with acne vulgaris are bromide and iodide eruptions, which may very closely resemble pustular acne and occur on the same situations, but never produce comedos. Finally there are the acneiform lesions produced by chlorine, tar, and mineral oils, which may show comedos, but are found on areas not usually affected by acne vulgaris—e.g., the forearms, penis, and scrotum.

INCIDENCE AND TREATMENT

Some degree of acne vulgaris seems to be the common lot of young people between the ages of 12 and 20. According to Bruno Bloch (Brit. Jour. Derm. and Syph., 1931, xliii., 61) out of over 4000 boys and girls examined in Zurich only 0·6 per cent. of the boys of 18 and 3·4 per cent. of the girls of 17 were entirely free from comedos. Severe grades of the affliction were found in 57 per cent. of boys of 19 and in 22 per cent. of girls of 18. Bloch published curves showing a very high degree of correlation between the time of appearance of the signs of puberty and the development of the severer grades of acne. There is a strong hereditary element in acne, or rather in the greasy skin which predisposes to acne, and in some families scarcely any members escape.

It is common knowledge that the great majority of those who suffer from acne in their youth eventually cease to be troubled by it (generally between the ages of 20 and 30), and unfortunately many medical men in general practice who have other and more serious diseases to think about are inclined to pooh-pooh "a few spots," and to advise no treatment as the sufferer "will grow out of it." No doubt he will, but perhaps not before he is permanently scarred and has suffered damage that may have far-reaching effects on his or her future life. Not only so but many girls, and some boys, become morbidly self-conscious about their spotty appearance, which casts a shadow over their lives. On all grounds therefore it is most important that acne vulgaris should be treated, and treated as early as possible, preferably before it has become pustular.

It is impossible to discuss prognosis apart from treatment. Many popular methods of treatment appear to be completely inert and therefore without influence on the prognosis. Such are purgation by salts, the eating of yeast and its extracts or preparations of tin, dieting (except for avoidance of chocolate and, in a few cases, of cheese), and the injection of manganese and of vaccines, except in rare cases of pustular acne. I can remember two cases and two only in which vaccines really had a dramatic effect, one being a staphylococcus vaccine and the other an autogenous acne bacillus vaccine. When the patient who had the latter vaccine relapsed in due course the pathologist was never able to prepare another vaccine which had any effect on the disease. With regard to intestinal antiseptics I have hitherto been a sceptic, but having regard to Arthur Whitfield's strong views on this point (Brit. Jour. Derm. and Syph., 1934, xlvi., 257) it is necessary to preserve an open mind.

What, then, is the prognosis in the ordinary case of moderately severe acne in an adolescent patient? I have found that with the liberal use of soap and water (to which some patients have an astonishing aversion) and of sulphur applications, the avoidance of greasy creams, and the omission of chocolate from the diet, combined with the methodical expression of comedos and the careful use of small doses of X rays, almost all cases of ordinary acne, whether punctate or pustular, can be cured. The methodical expression of comedos should be carried out with the appropriate instrument and under reasonably aseptic conditions. It should *not* be done by the patient spending every spare minute in front of her looking-glass "squeezing spots" with her nails. Comedos should be expressed before they have given rise to pustules. Ultra-violet light treatment is also helpful but it has not the permanent effect of X rays.

Cures brought about in this way seem to be permanent provided that the patient keeps the rules, continues to apply a sulphur lotion a few times every week, and does not allow his or her head to become scurfy. The only cases of relapse which I have seen took place in patients who after remaining well for some months gave up the prophylactic use of the lotion, or allowed their heads to become scurfy, or were persuaded by advertisements to use cold cream on their faces instead of soap and water, or applied oil when sun-bathing. The latter practice I regard as pernicious in any patient with a tendency to acne, for I have seen several women of ages between 25 and 35 who, having long since grown out of their acne, had a relapse following the application of oil when sun-bathing.

The scarring which is the end-result of severe acne may be due to atrophy caused by the pressure of the comedo on its surroundings, and in such cases it often produces a "worm-eaten" appearance on the cheeks. The damage produced by pustular lesions takes the form of more or less round, depressed, white scars. On the back these may be so numerous that practically no normal skin is left.

There is a popular idea that X ray treatment causes or increases scarring. That this is not the case was

shown by experiments made by H. D. Niles in America (Archives of Derm., 1933, xxvii., 89), in which in 40 patients with acne vulgaris only one cheek was treated by X rays and the final appearance of the two cheeks was compared. There was no difference between the scarring on the two cheeks in 32 cases, more scarring on the untreated cheek in 5, and more on the X rayed cheek only in 3.

When acne occurs for the first time in an adult one should make certain that one is really dealing with acne vulgaris and not with one of the other conditions mentioned in the first part of this paper. If the condition proves to be a genuine acne vulgaris it is no more difficult to cure than ordinary adolescent acne.

Acne conglobata.—The type of acne in which the prognosis is definitely unfavourable is that known as acne conglobata. In sufferers from this complaint almost the whole skin may be covered with blackheads, many of them of large size, while on the front and back of the trunk are many pustular lesions in which the suppurative process has burrowed more or less horizontally into the skin causing ramifying tunnels of pus which, when they eventually heal, leave extensive and severe scarring. This type of acne is extremely resistant to treatment and may persist throughout the patient's life. Fortunately such cases are rare.

One may say therefore that the prognosis in any ordinary case of acne vulgaris is good provided that the disease is rationally treated and that the patient will coöperate.

A. C. ROXBURGH, M.D., F.R.C.P.,
Physician in Charge of the Skin Department, St. Bartholomew's Hospital; Physician, St. John's Hospital for Diseases of the Skin.

SPECIAL ARTICLES

YELLOW FEVER IN THE ANGLO-EGYPTIAN SUDAN

SEROLOGICAL AND POST-MORTEM EVIDENCE

BY T. F. HEWER, M.D. Brist., M.R.C.P. Lond.
BACTERIOLOGIST, WELLCOME TROPICAL RESEARCH LABORATORIES, SUDAN GOVERNMENT, KHARTOUM

THE introduction of air travel has broken down one of the natural barriers to the spread of disease. When travel, in Africa and the Orient particularly, was confined to land or sea there was usually ample time for people to develop recognisable signs of any serious disease before they reached their destination; this was especially true of yellow fever, whose incubation period is only rarely more than six days. It is now possible for a person to be bitten by an infected mosquito in Central Africa and arrive in Cairo before he becomes ill. The recognition of this possibility, even though it be a very remote one, makes it urgently necessary to introduce preventive measures. If quarantine regulations were enforced at every air port, the passengers being kept in mosquito-proof rooms for two days or more on arrival, it would be worth no one's while to travel by air: it is obviously impracticable. Attention must then be directed to the prevention of infection of the passengers in transit and before they embark; and the first requirement is an accurate knowledge of the present geographical distribution of the disease. A few years ago it was thought sufficient to control aircraft coming from West Africa—a known endemic centre of yellow fever—but now there is evidence suggesting that the endemic area is very much larger than this.

SEROLOGICAL EVIDENCE

During the last two years a yellow fever immunity survey of Africa, instigated by the International Health Division of the Rockefeller Foundation, has revealed the presence of silent areas in which the disease appears to have been present without arousing the suspicions of the local medical authorities.

The survey depends upon the mouse-protection test evolved by Sawyer and Lloyd.[1] The test consists essentially of the inoculation of mice intraperitoneally with yellow fever virus, fixed for mice, together with the serum to be tested, and the simultaneous injection of starch solution into the brain to localise the virus. If the serum lacks protective power the mice die of yellow fever encephalitis. There is good evidence for the specificity of the test, and it appears that the protective bodies remain for many years, if not for life, in the blood of persons who have recovered from yellow fever.

Sera have now been collected from representative groups of adults and children in the southern and western provinces of the Sudan and in the central district of Khartoum. They were all sent to New York, where Dr. W. A. Sawyer carried out the tests in the yellow fever laboratories of the International Health Division of the Rockefeller Foundation. The results, which are being published in detail by Dr. Sawyer and Dr. Loring Whitman, indicate that the disease was present in Darfur province about eighteen years ago, 13 out of 61 adults over eighteen years of age giving protection, while not one of 46 children of various ages down to three years was positive. One of the positive adults was found, on subsequent inquiry, to have been resident in French Equatorial Africa for some years.

At El Obeid, in Kordofan Province, there were no protective sera among 52 persons of ages ranging from five to seventy, but in the Nuba Mountains, some eighty-five miles to the south, 7 out of 30 adults were positive, the youngest being thirty years of age; all the 15 children tested were negative.

The largest percentage of positive results was obtained from the Bahr-el-Ghazal province: at Wau 7 out of 27, and at Rumbek 17 out of 30 adults had protective sera. Three out of 24 children at Wau (aged six, six, and nine years), and 1 of 26, aged eleven years, at Rumbek gave positive results. No children, but 5 of 20 adults at Sources Yubo, and 4 of 16 adults at Li Rangu were positive, the youngest being aged thirty and twenty-eight respectively.

In Mongalla province at Juba, the Imperial Airways port on the Cairo to Cape route, out of 28 adults 3 were definitely positive and 3 others gave partial protection, which was considered inconclusive; 3 out of 22 children, aged seven, seven, and eight,* were also positive. At Amadi no children but 2 adults, aged twenty and forty, out of 20 tested, were positive.

In the Upper Nile province 19 children at Yirol were negative, no adults being tested; and at Malakal, another Imperial Airways port, among 55 persons, children and adults, there was 1 definitely positive, aged eighteen, and 3 inconclusive, aged eleven, eighteen, and thirty-five.

In Khartoum the only positive result was obtained with the serum of a man who had been resident in the Nuba Mountains. At Kosti, on the White Nile, the only positives were in people who were natives of Darfur, the Nuba Mountains, and the southern Sudan, thus tending to augment the results obtained in those areas.

In summary, from the results of the mouse-protection test it appears that yellow fever was present,

* The ages of these children were wrongly estimated in the first instance and reported to the Office d'hygiène as 12, 13, and 14.

probably in endemic form, in the Bahr-el-Ghazal six years ago; in Mongalla seven years ago; in the Upper Nile province between eleven and eighteen years ago; in Darfur eighteen years ago; and in the Nuba Mountains thirty years ago. There is no evidence that the disease was ever present in the desert areas to the north of the Sudan, the sera from El Obeid and Khartoum being entirely negative. It should be noted that in every case great care was taken to make sure that every person tested had lived all his life in the district being surveyed. A further check-up on the positive cases is still in progress in the Bahr-el-Ghazal.

CLINICAL EVIDENCE

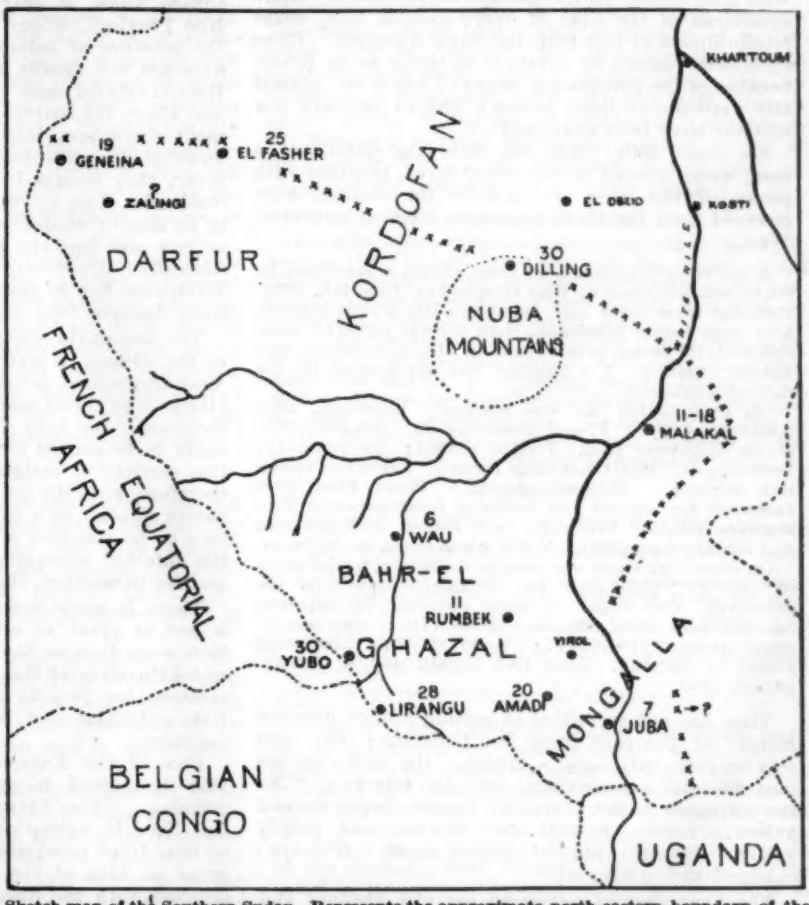
Although the mouse-protection test appears to be perfectly reliable and specific it really only provides data as to the presence of yellow fever in the past. When positive results are obtained in all age-groups of a community from three years upwards, in the absence of a recent widespread recognised epidemic, it is probably safe to assume that the disease is actually present in the locality; but the implications of such a decision are so serious that one must have more conclusive evidence.

Classical clinical cases of yellow fever occurring in epidemics in a susceptible population are generally easy to diagnose, but in the known endemic areas of West Africa and Brazil the classical manifestations of the illness are seldom seen. Soper, Rickard, and Crawford [3] have found the clinical diagnosis most difficult in those endemic regions in Brazil where the disease is most constantly present. In the native population the recovery-rate is high, and even in the fatal cases the classical signs and symptoms are often absent. It seems that any acute febrile disease in an endemic area may be yellow fever.

The issue is further complicated by the presence in Africa of a number of conditions, of unknown ætiology, giving rise to necrosis of the liver. In the Bahr-el-Ghazal province there was a small epidemic of jaundice in 1929; histological examination of the liver was made in a few instances and the disease was definitely not yellow fever. Moreover, the mouse-protection test was done on the sera of two persons recovered from the jaundice disease in this epidemic, and they were both negative. Similar isolated cases of hepatic necrosis and so-called "catarrhal jaundice" occur at frequent intervals in all parts of the Sudan. The spirochæte of Weil's disease has never been found.

Blackwater fever is another Sudan disease which bears certain resemblances clinically to yellow fever. It has, in particular, the common characteristic of occurring most frequently in Europeans who, being highly susceptible to yellow fever, are the very people who are likely to show clinical and classical signs of the latter disease. Blackwater fever is very common in the Bahr-el-Ghazal. The mouse-protection test has been performed on the sera of 7 Europeans, 1 Indian, and 4 Sudanese who had contracted blackwater fever in Darfur, Mongalla, and Bahr-el-Ghazal provinces; none of them gave any protection.

An interesting corroboration of the protection tests in Darfur is provided in a recent article by Prince Omar Tousson.[2] He gives an account of a battalion of 453 Sudanese soldiers in the Egyptian army, recruited from Darfur and Kordofan (in which province lie the Nuba Mountains), who were sent by Said Pasha to the Mexican War in 1863 to render assistance to Napoleon III. African troops were in great demand because they were known to be immune to yellow fever. The mortality from that disease among Europeans at Vera Cruz was alarming. Of these 453 Sudanese only one, their commanding officer, died of yellow fever; it is not clear whether he was Sudanese or Egyptian. It seems likely that this immunity was due to previous infection in the Sudan.



Sketch map of the Southern Sudan. Represents the approximate north-eastern boundary of the endemic area of yellow fever, as suggested by the mouse-protection test results. The figures over the place names are the ages of the youngest people whose sera were positive. The Imperial Airways use aerodromes at Khartoum, Kosti, Malakal, and Juba.

POST-MORTEM EVIDENCE

Since the clinical recognition of mild cases of yellow fever is impossible one must employ some more certain means of diagnosing the disease. This is provided by a routine histological examination of the liver of every person who dies of an acute febrile illness.

In Brazil protection tests gave positive results in some areas in which there had never been any suspicion of the presence of yellow fever. As in the case of the Sudan there were two possible explanations of these findings: either the test was not specific or yellow fever was present in such a mild form that deaths never resulted. Soper, Rickard, and Crawford made routine histological examinations of the livers of all persons dying of any acute febrile disease of less than ten days' duration in these regions and found a large number with definite evidence of yellow fever, thus proving that the "silent" areas are only silent because of the impossibility of recognising them clinically. They have invented an ingenious instrument, called a viscerotome, which can be inserted into the liver of a corpse without the necessity of doing a post-mortem or opening the abdomen. The Rockefeller Foundation has very generously presented the Sudan Government with a number of these instruments, and they have been distributed to the suspected provinces with instructions to the medical inspectors to collect specimens of the liver of every case of fatal acute febrile illness of less than ten days' duration. These specimens cannot be obtained as easily as in Brazil, because of the prejudice of many of the tribes against any violation of dead bodies; and so far very few sections have been examined.

On June 30th, 1934, the following details of a case, which proved to be yellow fever, together with pieces of the liver and kidney for section, were received from Dr. G. C. Cochrane, medical inspector, Wau.

A native of Wau town, 18 years of age, a fisherman by trade, was admitted to Wau Hospital on June 9th, 1934, suffering from fever and jaundice. His illness started, four days before admission, with several repeated chills followed by fever, severe pain in the epigastrium, and bilious vomiting. The jaundice was not noticed till the day of admission.

On examination he was markedly jaundiced, with temperature 100·2° F. and pulse-rate 80; complained of severe epigastric pain. Tongue coated; no vomiting; bowels open. Heart and lungs normal. Liver and spleen not palpable. Reflexes normal. Blood films were examined for malaria and relapsing fever parasites with negative results. The urine was loaded with albumin and contained no sugar. Nothing was found in the fæces.

On June 10th there was marked delirium; temperature 99°–100° F.; pulse-rate 85. Became comatose in the afternoon. One ounce of urine obtained by catheter, heavily laden with albumin. June 11th: deep coma; temperature 101°–102° F.; pulse 85–90. Urine very scanty by catheter. June 12th (eighth day of illness): patient died.

Time has not permitted of getting a more detailed history of the case from Dr. Cochrane; the mail service runs only once a month. His notes on the post-mortem examination are as follows: "No hæmorrhages in the skin. All tissues deeply stained yellow. Liver: normal size, friable, and deeply yellow. Spleen: normal, rather small. Kidneys: enlarged and congested."

The liver showed advanced necrotic changes and Councilman lesions highly suggestive of yellow fever. A section was sent to Dr. G. M. Findlay, of the Wellcome Bureau of Scientific Research, London, who confirmed the diagnosis. In the kidney the outstanding feature was degeneration of all the epithelial cells, including those covering the glomerular tufts and all the tubules; no cellular infiltration. The lumen of the tubules contained hyaline amorphous material.

This is a case whose diagnosis might well be made on clinical grounds, but the heavy albuminuria seems to be the only feature in which it differed from some other very similar conditions which were shown, on section of the liver, to be hepatitis of unknown ætiology.

Such spectacular cases are not very frequently seen, and judging by the results of the mouse-protection tests in Wau and Rumbek districts the majority of the infections must be extremely mild and impossible to diagnose.

DANGER TO FOREIGN RESIDENTS IN ENDEMIC AREAS

One of the first points raised by critics of the protection test results in the southern Sudan has been the apparent absence of any case of yellow fever among the foreign residents. There are several factors which may be adduced to explain this apparent anomaly.

The total foreign population (non-Sudanese) of the Darfur, Bahr-el-Ghazal, and Mongalla provinces, comprising a total area of approximately 293,000 square miles, is only 580 persons. In the Upper Nile Province, where there is much less evidence of the presence of yellow fever, the foreign population numbers 306, mostly in the town of Malakal. In the Bahr-el-Ghazal and Mongalla provinces there are also about 100 natives of the northern Sudan (government employees, servants, &c.) and, as they are undoubtedly susceptible to infection with yellow fever, they should be added to the total of foreign residents. This leaves us with only some 700 persons, in an area of 293,000 square miles, who are definitely at risk and capable, if infected, of being diagnosed clinically. Moreover, a large proportion of the Europeans live in mosquito-proofed houses placed at some distance from the native quarters.

The stegomyia mosquito, which is the chief vector of the disease, is extraordinarily local in its habits. Mosquitoes bred in one house or garden are not at all likely to travel more than a hundred yards in any direction. As they frequent houses they are less likely to be carried far by wind than are the anopheline carriers of malaria. It will be seen that it is therefore possible for yellow fever to exist in the native quarter of a town and for stegomyia mosquitoes to be common in all districts and yet, because the infected mosquitoes do not migrate from one quarter to another, the disease may not spread.

There is some reassuring evidence that the risk is not as great as might be imagined. Protection tests were done on the sera of 7 Europeans, 1 Indian, and 13 natives of the northern Sudan who had been resident for periods between 5 and 30 years in the Bahr-el-Ghazal and Mongalla provinces: all were negative.

Five of the Europeans were Italian missionaries who had lived in houses without any mosquito proofing. The 13 natives of the northern Sudan had lived in native quarters, also without any protection from mosquitoes. On the other hand, this gives no idea of the number who may have been infected with the disease and succumbed. There is still a possibility that some of the deaths attributed to blackwater were in reality yellow fever.

THE MOSQUITO VECTOR

A mosquito survey is still in progress, but the following data, although incomplete, give some idea of the distribution of the important species.

Aëdes (*Stegomyia*) *ægypti*, the acknowledged vector of yellow fever, occurs in Khartoum, but has been found commonly in El Obeid, the Nuba Mountains, and Darfur (Fasher and Geneina). In Juba it is regularly obtained from stagnant water in and near houses. At Wau very little collecting has been done but this mosquito has been recorded. Its presence is also reported from other parts of Mongalla province. In Malakal specimens were collected in 1909 but there has been no subsequent record, and it would not appear to be common.

A few specimens of *Aëdes luteocephalus*, another possible vector, have been found at Juba. *Aëdes apicoannulatus* and *A. africanus* have not so far been found in the Sudan, but *A. vittatus* is abundant in the Nuba Mountains, Darfur, and Mongalla, including Juba. *Mansonia* (*Taeniorhynchus*) *africanus* has been recorded from Fasher, Juba, and Malakal.

Dr. Aldridge and Dr. Stephenson, of Juba, have been very active in collecting mosquitoes, and it is possible that stegomyia may be found elsewhere more commonly than the present records would lead one to suppose.

MEASURES TAKEN AT AERODROMES

The Sudan Government has become signatory to the International Convention for Aerial Navigation. At Juba disinsectisation of all planes is carried out, and the passengers are medically inspected in order that any who have been exposed to a risk of infection may be placed under observation. The hotel where passengers and crew spend the night is mosquito-proofed and the quarters of the local officials of the Imperial Airways are also proofed. Disinsectisation and medical inspection of north-bound planes is repeated in Khartoum.

The aerodromes at Juba and Malakal have been made anti-amaryl to satisfy the rigid regulations of the Air Convention, and the Bahr-el-Ghazal province has been closed to all international air traffic and all aircraft within the Sudan. Article 47 of the International Sanitary Convention for Aerial Navigation has been enforced at Juba and Malakal, and passengers from the Bahr-el-Ghazal province will be subjected to observation for the prescribed period.

DISCUSSION

The reliability of the mouse-protection test for yellow fever has now been established beyond any possible doubt. In Brazil the test gave positive results in previously unsuspected regions, and post-mortem evidence subsequently justified them. Precisely the same sequence of events has occurred in the Sudan.

Positive protection tests were obtained by Dr. Sawyer (unpublished) with sera from French Equatorial Africa and the Belgian Congo, especially high percentages being found in the northern part of the Congo, where it joins the Sudan, and in the adjacent French territory.

The area in which yellow fever is endemic in Africa appears to be roughly triangular in shape, with its base on the west coast and its apex in the southern Sudan. This enormous stretch of country can never be cleared of mosquitoes, and any hope of the final eradication of yellow fever from Africa becomes extremely remote. One must aim at limiting its spread. The exact boundaries of the endemic areas will have to be more accurately defined by further protection tests. We do not yet know how far it reaches to the east of Juba. Mosquito control can be enforced in the chief towns and government stations, but it is impossible in the outlying villages. With greater medical vigilance more cases of the disease will be recognised and proper precautions taken.

It is absolutely essential that all houses occupied by foreigners should be adequately mosquito-proofed.

An additional and effective measure of protection will shortly be available for all persons visiting or residing in the yellow fever zone. In 1931 Sawyer, Kitchen, and Lloyd [4] immunised ten persons with a mixture of neurotropic yellow fever virus, fixed for mice, and immune serum. These workers in New York, and Marshall Findlay [5] in London, have now greatly improved the method of immunisation so that the risks of unpleasant reactions are comparatively slight. It is to be hoped that it will be possible very shortly for all persons flying through Africa to be inoculated; the danger of spreading the disease by air will then be practically eliminated.

SUMMARY

(1) The results of a yellow fever immunity survey by the mouse-protection test of the Anglo-Egyptian Sudan are reported. (2) On the strength of these a wide zone in which the disease appears to be, or to have been, endemic has been defined. The Imperial Airways route to the Cape runs through this zone. (3) A case highly suggestive of yellow fever both on clinical and pathological grounds occurring in a native of Wau is described. (4) The difficulty of diagnosing mild, or even fatal, attacks of the disease in the native population is discussed. (5) Measures adopted for preventing the spread of the disease by air are described and a plan of campaign for combating it is briefly outlined.

ACKNOWLEDGMENTS

The Sudan Government is greatly indebted to Dr. W. A. Sawyer, Dr. Loring Whitman, and the International Health Division of the Rockefeller Foundation for performing the mouse-protection tests, and for their kindness in supplying information as to the results.

My grateful thanks are due to Sir Robert Archibald, director of the Wellcome Tropical Research Laboratories, Khartoum, and Dr. E. D. Pridie, director of the Sudan Medical Service, for allowing the survey to be made and for their advice and assistance. We are also indebted to Dr. G. M. Findlay for confirming the diagnosis of the section of liver from the case of yellow fever.

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LONDON LOCK HOSPITAL.—Last year there were 23,369 in-patients, out-patients made 180,000 attendances, and over 18,500 pathological tests were made. It is the only voluntary hospital which admits maternity cases suffering from venereal disease, and in 1933 of 53 deliveries there was only one stillbirth, and no baby born of a treated syphilitic mother bore signs of the disease. Lord Kinnaird, the chairman of the board of management, explains that the hospital is so handicapped by a debt of £20,000 that "unless substantial donations are immediately forthcoming it will be compelled to close down."

BRITISH MEDICAL ASSOCIATION

MEETING IN BOURNEMOUTH

SECTION OF MEDICINE

AT the last meeting of this section the chair was taken by Prof. J. G. EMANUEL (Birmingham), vice-president, and Dr. T. IZOD BENNETT (London) opened a discussion on

Œdema, its Causation and Treatment

In all cases, he said, œdema implied that the passage of fluid into the tissue spaces exceeded the return from them into the lymphatics and capillaries. Attention must be concentrated on the region and boundaries of the tissue spaces. The only two factors of major importance governing the passage of solution from the capillaries to the tissue spaces and back were the intracapillary blood pressure and the colloid osmotic pressure of the plasma proteins. The thin capillary wall acted as a semi-permeable membrane. The intracapillary pressure was probably very difficult to increase at the arterial side, but at the venous side it was easily raised by any condition of back pressure, such as failure of the right heart. The colloid osmotic pressure tended to counteract the intracapillary blood pressure, and was a constant drag on the passage of fluids from the capillaries into the tissue spaces. As transudation took place the forces gradually became balanced, until there was a flow in the reverse direction. The colloid osmotic pressure was diminished by loss of protein from the blood, as in extreme albuminuria—and loss of albumin was more important than loss of globulin. The removal of plasma proteins in animals produced œdema, and a loss of plasma proteins into the peritoneum, stomach, or elsewhere in man had the same effect as prolonged albuminuria. This factor was of extreme importance in the production of œdema. Increased permeability of the capillary wall might be of some importance in acute nephritis, and certainly was important in urticaria, but it would not by itself produce œdema, which was in this case probably due to the resulting transudation of protein through the capillary wall. Sodium chloride was in all cases an important factor in determining chronicity. It would not produce œdema alone, but it tended to hold water in the tissue spaces, and so in almost all cases was of importance as an ancillary; it was the sodium ion that was important and not the chlorine.

Treatment must be based on a consideration of these factors. Anything improving the output of the right ventricle would ameliorate cardiac œdema. Prolonged rest was therefore essential and digitalis was most valuable if auricular fibrillation was present. The progress of œdema could be watched by observing the water balance, all fluids taken during the 24 hours being set out against the total output of urine. The fluid intake should be limited to 25 to 30 oz. daily, and only traces of salt should be allowed in the diet. If, in spite of rest, diet, and digitalisation, œdema persisted, the mercurial diuretics, particularly salyrgan, were often very valuable, and the diuresis produced by them was increased if ammonium chloride was given simultaneously. Acute pulmonary œdema required morphia and immediate venesection. Its onset was signalised by cardiac dilatation, paroxysms of nocturnal dyspnœa, and the appearance of moist sounds at the bases of the lungs. There were two, probably three, varieties of renal œdema. There was a terminal œdema due to cardiac failure in chronic nephritis with high blood pressure; this was not usually accompanied by renal failure, and was no contra-indication to salyrgan. The second variety was seen in so-called "nephrosis," in which long-standing albuminuria had reduced the plasma proteins so much that œdema appeared. There was heavy albuminuria without rise of blood pressure, and without any of the changes characteristic of renal failure. A high protein diet was indicated, vegetable protein particularly being given. Salt should be forbidden and the water intake limited. Salyrgan was not contra-indicated unless there was a progressive renal lesion. The treatment was entirely different in acute and subacute glomerular nephritis. In these cases no strain must be thrown on the kidneys. Starvation must be as complete as possible in the early period, and remarkable recoveries were frequently achieved by restricting food to small amounts of fruit. Subacute and chronic cases were more difficult. A low protein diet was usually indicated, and septic foci must be eliminated.

Dr. A. W. STOTT (London) said that a large number of cases of chronic heart disease ultimately died of congestive heart failure, a name which stressed the fundamental feature of the syndrome: venous congestion throughout the body. The clinical features were easily recognisable—orthopnœa, cyanosis, abnormal fullness of the jugular veins, enlarged liver, ascites, and subcutaneous œdema. Mistakes in diagnosis were occasionally made. There must be obvious evidence of venous engorgement, especially in the neck, liver, and lungs. So late a stage of the condition should be prevented if possible, but unfortunately the cause of failure of the heart was not known. Sometimes an infection, even a trivial one, might precipitate it; in others it began with auricular fibrillation. The fact of early myocardial weakness should be recognised if possible, and the cardiac reserves maintained. The danger signal of increasing dyspnœa warned the physician long before signs of congestion appeared. The patient should then be rested and protected as far as possible against infection, and the ventricular rate controlled by digitalis. Even with gross failure, full doses of digitalis would often bring about dramatic results, but there were resistant cases, and few patients suffering from severe congestive failure with a normal rhythm were much helped by this drug. For them there must be complete rest—not such a simple matter as it seemed. A relatively upright position was advantageous to a patient suffering from the severe discomfort of generalised œdema and orthopnœa. Failing a cardiac bed, it was often best to keep the patient in a comfortable chair. Meals must be small, dry, and easily digestible, and only 20 to 30 oz. of fluid should be given in the 24 hours. The xanthine and mercurial diuretics were the most useful. Theobromine and theocin might cause gastro-intestinal disturbance, and should be discontinued if they did not act within a few days. Salyrgan was powerful and practically non-toxic, and rarely caused unpleasant effects. Its results might be increased by producing a preliminary acidosis for a few days, but this was not often necessary. Treatment did not end with relief of œdema; the patient must always thereafter lead a restricted life. A prophylactic injection of salyrgan once or twice a week might prove to be as valuable as its more dramatic use.

Dr. H. GAINSBOROUGH (London) confined himself to renal œdema and thought that the condition called nephrosis was really nephritis. There was every conceivable grade between the extremes of

acute and chronic nephritis, and a distinction between them was artificial; one cause might produce varying effects. The chronic form showed an insidious onset, a heavy albuminuria and œdema, which might last for months or years, and might come and go. Recovery was, however, rare, and when albuminuria persisted after the tendency to œdema had finished, there was a period of apparent latency, and then the symptoms reappeared. Increasing destruction of the kidney abolished œdema, and possibly the same factor might control œdema in acute cases. Very little advance could be recorded in the treatment of renal œdema. The most effective diuretics were urea, acidosis-producing salts, and organic mercury compounds such as salyrgan. Urea was always indicated, but sometimes failed. The salts sometimes worked excellently but sometimes caused nausea. Salyrgan quite possibly acted by damaging the kidney, and it seemed most unwise to give any drug which might add to the harmful influences affecting that organ. The patient must be treated generally with good food, sunlight, fresh air, and warmth, but the protein of the diet must be kept down to basal requirements. Iron was sometimes helpful; over-hospitalisation was to be avoided, and the patient needed a sanatorium type of life.

Dr. GEOFFREY EVANS (London) said that the œdema of kidney disease might appear in a cardiac form, in a subthyroid form, or, rarely, in an angio-neurotic form. There was often a cardiac factor in both acute and chronic nephritis, and digitalis might be of real value. Prompt improvement might follow venesection in acute nephritis, and occasionally thyroid might do good. The toxic factor might be present in all forms of Bright's disease, and starvation might be helpful. In any single case of nephritis the ætiological factors might be varied. Whatever the type of the disease, the physician must look out for the possible presence of any of the known factors producing œdema. Salt restriction might be useful in some cases, and in others might prove intolerable and lead to uræmia. Salyrgan must always be used with caution in kidney disease. Decapsulation was useful in selected cases.

Dr. J. MAXWELL (London) said that the chief factors concerned in the causation of œdema were: (1) increased capillary pressure; (2) increased capillary permeability; (3) alteration in the osmotic balance between the plasma and the tissues, particularly in respect of their protein and sodium contents; and (4) certain little understood factors such as the endocrine system and the hypothetical water-regulating centre.

Increased permeability meant that colloids were passing out of the vessels, which should not normally occur. Certain substances, however, such as alcohol and mercury salts, could bring it about. There was a good deal of protein in the œdema fluid of acute nephritis, inflammation, and heart failure, but very little in nephrosis and nutritional œdema. The chief causes of localised œdema were acute inflammations, urticaria and, rarely, renal conditions. It had been suggested that urticaria was the result of the local release of a substance resembling histamine, rendering the capillaries temporarily more permeable. Injection of adrenaline into the swelling was often very effective, but no known method prevented the attacks. Calcium therapy sometimes relieved the patient and often failed; protein shock had only temporary success, and specific desensitisation unfortunately only rarely gave good results.

Dr. F. BOTTOMLEY (Bournemouth) thought that heat was valuable in certain cases, as shown by an increase in the excretion of urine.

Prof. LANGDON BROWN (Cambridge) said that the value of hot air baths probably depended largely upon the removal of salt from the tissues in the resulting sweat. If the patient was responding well, there would be diuresis, and the sweating would occur at a progressively lower temperature. In the early stages of acute nephritis he recommended a diet of fruit juice and glucose.

Dr. E. L. SERGEANT (Hangchow) suggested that the blood calcium might be examined in the angio-neurotic type of œdema, from analogy with rhinorrhœa.

Dr. N. E. WATERFIELD (Great Bookham) regretted no mention had been made of the value of intramuscular inoculation of the patient's own blood, a method of treatment he had often found successful when all other methods had failed in urticaria or angioneurotic œdema.

Dr. W. N. LEAK (Winsford) commented on the possibility of an associated vitamin loss.

Dr. JOHN PARKINSON (London) thought that rest in a chair was not so good as rest in bed. He would not himself restrict digitalis to auricular fibrillation; he had found it useful in œdema when rhythm was normal and sometimes in postponing the onset of œdema.

SECTION OF PATHOLOGY, BACTERIOLOGY, AND BIOCHEMISTRY

A MEETING of this section, with Prof. J. W. BIGGER (Dublin), the president, in the chair, was devoted to the value of

Antiseptics in Control of Bacterial Infections

Prof. C. H. BROWNING (Glasgow) emphasised that, though Lord Lister had left little printed record of his theory or methods, and that little rather a confused record, Sir Hector Cameron, one of his students and friends, had clearly summarised them. Lord Lister did not employ carbolic acid in the treatment of abscesses, although his imitators did. But naturally he was limited in his practice by the antiseptics then available. In the main modern opinion agreed with Lister's opinions on his antiseptics; though there were some, such as boric acid, which he had belauded, which now found little support. The great ambition of Ehrlich, the finding of an antiseptic capable of restraining the harmful action of bacteria while being entirely innocuous to man, was still a legitimate and an increasingly hopeful objective. The older antiseptics were deleterious to living tissue, and were usually ineffective in the presence of serum. New antiseptics, entirely innocuous and little affected by serum, had been found; among others, brilliant green and flavine were particularly worthy of attention.

The power of an antiseptic to kill an organism was usually measured by the Rideal-Walker or Chick-Martin test. But these tests only touched the fringe of the problem. Organisms differed greatly in sensitiveness to the antiseptic; perhaps we should select a specific antiseptic against specific organisms. Moreover, the limitation of virulence of organisms without actually killing them was possible with certain organisms and certain antiseptics. The possible reaction of the host, and its assistance through the stimulus of the antiseptic, must not be forgotten. The study of antiseptics was made easier by the use of actual living tissue, in the animal body or in tissue culture. In one instance a control experiment, on a human being, was possible, and had

shown the marked benefit of flavine compared with boric acid. In animals the diphtheria bacillus was an exceedingly useful test organism for examining the power of antiseptics to prevent infection and to arrest it in the early stages. Antiseptics must be considered in relation to their action before infection, in early and localised infections, and in generalised infections. Only in the first two cases were they now of proved value. But physicians, surgeons, bacteriologists, and chemical physicists must unite in extending the present boundaries of chemotherapy.

Dr. R. J. V. PULVERTAFT (London) said that Prof. Browning's optimism, as the originator of most that was valuable in chemotherapy, was encouraging and stimulating. The fact that conditions innocuous to man yet harmful to the organism could exist was proven by normal recovery to infection, and supported by the daily practice of housewives, house surgeons, and pathologists when they cut their fingers. He drew attention to the variability of test organisms and in particular of the Rawlings strains of *Bacillus typhosus*, used in the Rideal-Walker test, and described experiments showing how antiseptic values varied with bacterial growth phases. He criticised the use of mercury salts in septicæmia, of urinary antiseptics, and so-called germicidal anæsthetics, and in conclusion asked for entirely new criteria of antiseptic values to be officially laid down.

Dr. G. W. THEOBALD (London) asked for greater consideration to be given to the reaction of the host rather than the bacillus. Life was a complicated biological problem, not to be confined to test-tube experiments. He particularly instanced the possibility of hepatic damage in various conditions and its effect on inflammatory reaction. He described excellent results in midwifery following a careful aseptic and antiseptic routine. Mercurochrome was, he believed, of value, but chiefly in acute infections with *B. coli*. He also believed in the efficacy of brilliant green and acriflavine in localised infection, and mentioned the well-established prophylactic value of gargling in support of chemotherapy.

Mr. ZACHARY COPE (London) thought that chemotherapy was returning to popularity. The newer antiseptics, such as the hypochlorites and flavine, were far better than the older ones, which often even produced pustules on the skin. In general, however, antiseptic treatment was limited to infections under four hours old. Antiseptics could not penetrate into devitalised tissues, and could not touch established and generalised infections. Here the classical surgical weapons of excision and drainage were still supreme. But he thought surgeons and bacteriologists might well revise some of their ideas in the light of Prof. Browning's discoveries and those of his co-workers.

Dr. SYDNEY THOMSON said that antiseptics had a wide use in dermatology. Their specific action was often helped by their solvent action on tissues, such as that of tri-chlor-acetic acid and salicylic acid. The action of ichthyol was difficult to explain on the basis of its antiseptic value. He drew attention to the dangers of mixed antiseptics—of iodine and mercury, causing a biniodide burn, and zinc oxide and eusol. Personal idiosyncrasy to antiseptics such as picric acid made choice of antiseptic important. In agreement with other speakers, he expressed his high opinion of brilliant green and flavine treatment.

Sir ARNOLD LAWSON (London) was more impressed by the value of drainage than antiseptics in the treatment of conditions of the eye. He did not consider the antiseptic action of lysozymes as described by Prof. A. Fleming to be of much importance. The usual rule appeared to be that the worse the eye, the more generous should be antiseptic treatment; the reverse was in fact true, and this often led to corneal ulcers. Silver salts were effective antiseptics, but irritant, and he used acriflavine as the antiseptic of choice in most cases, in a strength of 1 in 2000.

Mr. J. S. WOOD (Parkstone), speaking as a veterinary surgeon, pointed out how differently different animals reacted to infection and antiseptics. The paler the flesh of the animal, the more rapidly it healed; the pig healed very quickly. Flavine was not much used in veterinary surgery, partly because of expense. Glycerin, potassium permanganate, and sea water, which in Bournemouth was laid on in pipes, were the chief veterinary antiseptics.

Dr. L. P. GARROD (London) said there was too much "clinical impression" and too little serious testing in the matter of chemotherapy. Ridiculous claims were made for certain antiseptics owing to the use of inept testing methods. Bacteriologists were not going the right way to impress surgeons; and it was the surgeons who had to be impressed. There were not enough standard and scientifically adapted tests; such tests should be provided.

Prof. BROWNING, in reply, said there was at present no alternative to orthodox surgical treatment of established infection. But much ground had been consolidated, and the antiseptic of the future was likely to be as much better than those of the present day as ours were than Lord Lister's.

Staphylococcal Infections

Dr. H. J. PARISH (London) then read a short communication on new methods in the treatment of staphylococcal infections. He mentioned the older methods of vaccines, bacteriophage, and Besredka's local immunisation. Toxoid and antitoxin were new methods and might sometimes be used together. There were conflicting reports on the value of toxoid treatment. This might be attributable in part to the complexities of staphylococcal toxins; but toxoid treatment undoubtedly raised the antihæmolytic value of the serum and was praised by many workers in the treatment of boils, sycosis, and osteomyelitis. Blepharitis was particularly benefited and certain diabetics with staphylococcal infections ceased to need insulin after its use. Data on the value of antitoxins were less full, but on the whole encouraging. But more knowledge of the nature of staphylococcal toxin was necessary.

The PRESIDENT, as one of the first workers on the toxin, wished to know how many staphylococcal toxins there now were; this Dr. PARISH described as a difficult question. Dr. E. ff. CREED (London) did not believe in a direct relationship between antitoxic value in the serum and general immunity, and Dr. GARROD supported this view, and suggested that bactericidal properties of serum were being forgotten. Dr. PULVERTAFT gave some support to the value of toxoid and antitoxin, but suggested that the dosage of toxoid required more study, since increase in the dose did not always give more antihæmolysin in the serum.

SECTION OF MEDICAL SOCIOLOGY

Dr. H. GUY DAIN (Birmingham), president, took the chair at this section, when Dr. G. P. CROWDEN (London) opened a discussion on

Defective Hearing as a National Problem

The national and individual handicap of visual defects had, he said, been very markedly reduced, but the same could not be said of hearing. The

special question of the congenitally deaf had been given careful and detailed attention; the problem under discussion only arose with acquired deafness. It was computed that there were approximately 40,000 totally deaf individuals in Great Britain at the present time, but the number of partially deaf or "hard of hearing" was largely a matter of conjecture. It might be estimated at 2,500,000. Many of these, however, were not seriously handicapped. For the remainder, special problems of social life, education, and employment had to be faced. In the majority of cases the cause of defective hearing was disease, and the subject must be approached from the points of view of both preventive and curative medicine. Army statistics were enough to convince anyone of the serious state of the health of young manhood. The chief cause of rejection of men applying for service was middle ear disease. The ratio of rejections for this cause had in recent years increased to over 50 per 1000, and the same condition headed the list of causes of discharge within six months of enlistment. In 1928, out of 53,075 applicants for service in the Army, 2568 had been rejected as physically unfit on account of diseases of the middle ear and deafness. In 1932, 54,159 men were examined and 2993 rejected for the same reason, while a further 290 were discharged as unfit on these grounds within six months of enlistment. Therefore, between 5 and 6 per cent. of the young men of the nation showed evidence of diseases associated with deafness. The problem was, therefore, obviously one of great national importance.

Although disease was the principal cause of defective hearing, deafness might also be caused by noisy employment or accident and advancing age. Before any steps could be taken to prevent and limit the ravages of diseases affecting hearing, it was essential to know the common age of onset and to find a reliable routine method of diagnosis. The returns of the routine inspection of school-children recorded defects of hearing in only 4·2 per 1000. It seemed highly probable that a great deal of minor impairment of hearing in children passed unnoticed owing to the difficulty of testing under the conditions of school medical inspection. The 4a gramophone audiometer was an ideal method for group testing of children and for detection of the early signs of deafness. A hundred children an hour could be tested in groups of 32 or 40. A preliminary survey on children in the Borough of Hornsey had shown that the audiometer picked out all the known cases of hearing defects, and also a large number of previously unsuspected cases, all of whom were found by the aurist to need treatment. The total was 6·6 per cent. instead of the 0·42 per cent. of the annual returns. Subsequent tests have confirmed these findings, and had shown that methods of prevention must be devised to include children of pre-school age. Deafness due to noisy employment was most satisfactorily combated by an ear-stop of cotton-wool and wax, as devised by Mr. W. R. Luxton. The experience of the school medical authorities in Tottenham had proved that it was possible and practicable to detect and treat a very large proportion of cases of early ear disease, and to restore hearing to normal in many cases where the defects were severe. If this could be done locally it could be done generally.

Air Commander A. V. J. RICHARDSON described the significance of the hearing problem in admission tests for the Royal Air Force. The boys were enlisted for life and had a fairly stiff examination to pass at the outset. Of 5750 candidates analysed 0·7 per cent. had been rejected for ear disease. In 1925–32 only five apprentices had been invalided (from some 1200 men) for ear trouble. The explanation of the low figures was probably the greater intelligence of the group from which recruits were drawn. Prompt treatment and daily skilled dressing accounted for the low invalid rate. Inner ear deafness, due to testing engines or flying unprotected, was rare and transient. Air Force men were not kept permanently on noisy trades and permanent damage did not occur. Ear-stops and properly fitting helmets were used. Noise had been found to be a factor in inducing fatigue in flying personnel but was not the only factor. The time-honoured tests were used in testing recruits—largely the whispered voice.

Dr. A. R. FRIEL spoke of the prevention of deafness due to middle-ear disease in school-children. Deafness was commoner in the poorer children, middle-ear disease was not unusual in children under 7, and was nearly always secondary to mouth, nose, or throat conditions, which must also be treated. Conservation of time was of great administrative importance and helped to ensure the coöperation of the relatives; therefore every child should have a precise appointment at the clinic. Zinc ionisation was able to save the situation; in most cases the ear was quite well after two or three visits. Acute cases were given glycerin and carbolic mixture to pour into the ear two or three times a day, keeping the ear filled with it for twenty minutes. The commonest cause of discharging ears after otitis media was tympanic sepsis, followed by external otitis, attic, and mastoid disease. Only the last two were inaccessible to zinc ionisation. In the acute stage the nasal or pharyngeal condition could always be found, but might have disappeared by the chronic stage of the ear condition. Children found blowing the nose difficult, and secretion collected at the back forming a mechanical irritant. Diastolisation was a very important method of treating nasal infection; the nurse or the mother could do it and the results were very good.

Dr. A. H. GALE (London) said that from the educational point of view deaf children could be divided into totally deaf, partially deaf (i.e., unable to benefit from ordinary education), and those able to join in general classes but perhaps needing special consideration. The definition of the second group was difficult; the latest figure was 1745 throughout the country (0·35 per 1000), but this was said to be too low. Some authorities would put the incidence as high as 5 per cent. of all school-children. From the educational point of view the hearing of the better ear was what mattered. There was a considerable margin of safety between a defect recorded by the audiometer and a social disability. In the third group the medical aspect was more important than the educational. Increased efficiency in routine inspection could be obtained by a brief examination with an electric auriscope. If the school medical officer detected ear discharge he did all he could be expected to do, but at present many cases were missed. A history of ear trouble taken at a school inspection had shown an incidence of 13·9 per cent. The gramophone audiometer was of great value in detecting cases which could not be recognised by inspection.

Prof. A. W. G. EWING (Manchester) observed that audiometer tests of 27,000 children in Rochester, N.Y., had shown that one child in 76 needed medical and special educational attention for ear defect. The implication was that in this country many cases were being missed. Investigations had been made

on the relation between hearing for pure tones and hearing for speech, and the gap between routine tests and everyday hearing could now be bridged. Deafness might not be noticeable to the patient, or to his friends or teachers, until hearing had been very seriously impaired. "Problem" children, with no history of deafness, or children adjudged to be mentally defective or retarded, might prove to have undetected hearing defects which accounted for all the trouble, including speech defects. The whole field of auditory defects appeared ripe for a great advance owing to the revolution in the physics of sound.

Dr. PHYLLIS KERRIDGE reported the result of a test of over a thousand adults who had applied to a commercial firm for hearing aids. There were four chief types: 52 per cent. had maximum loss for high tones, only 5·5 per cent. for lower tones, and 5 per cent. approximately uniform loss, the remaining 37·5 per cent. having loss for middle tones. On the average, 50 per cent. hearing loss equalled 60 decibels of hearing loss, or inability to hear loud speech at an ordinary distance. The figures for deaf children were of the same order. The technique of diagnosis of hearing loss was greatly in advance of that of compensation. Deafness with maximum loss in the middle tones was much easier to compensate than the common type of loss of the higher tones. The National Physical Laboratory was undertaking the difficult tests required.

Major-General P. H. HENDERSON (War Office) discussed the problem as it affected recruiting for the Army. Recruits represented every social class and were probably a fair sample to discuss. Ear trouble was now recorded in the Army records as "middle-ear disease," because this had proved to be the commonest cause of deafness though it might not cause it. ("Deafness" was the old formula.) The drum was inspected in every case, hearing tests being given secondary importance only. Electric auriscopes were used. A series of numbers was read out at 20 feet in a strong whisper, including all ranges of pitch, and each ear was tested separately. In the years 1904–13 the average rejection figure was 3·05 per 1000; in the decennium 1924–33 the figure was 45·45 per 1000. The corresponding figures for discharges (i.e. after enlistment) were 0·42 per 1000 and 5·48 per 1000. This indicated a great increase in the incidence of ear disease, and did not include the many applicants who were rejected by recruiting officers without ever getting so far as medical inspection. There had been a similar increase in other causes of rejection, with the sole exception of the chest measurement, which could usually be brought up to standard by a little instruction in breathing. There seemed to be a grave deterioration in the post-war youth. Some authorities thought the change in figures was due to improved examination; with this view Major-Gen. Henderson, as head of the department concerned, could not agree, but believed the examinations to be less thorough now than before the war. He hoped that things would improve when the present school generation came to recruiting age. Ear disease was the chief cause of rejection of recruits and lost thousands of men for the Army, with the result that the general standard of physique for the Army had to be lowered. The subject was, therefore, of great national importance.

Dr. H. M. S. TURNER (Abingdon) described an apparatus like the audiometer that he had devised many years ago, and the difference he had noted between tone deafness and speech deafness. Some people seemed to be deaf to certain vowel sounds, and if these sounds occurred often in a conversation they thought they were getting deaf and became inattentive; he had called the condition "auditory astigmatism." In his apparatus he had had a switch so that the patient did not know which ear he was listening with; this had proved valuable in detecting malingerers. He commented on the extraordinary complacency with which a running ear was regarded by some practitioners.

The PRESIDENT thought that modern apparatus would greatly improve diagnosis, and this led to treatment. Prevention, however, went back to naso-pharyngeal infection, and possibly to diet. More might be done by early correct dieting than by any other means.

Dr. CROWDEN, in reply, said that certain numbers, like three and one and six, tended to be confused by deaf children. The problem, to be tackled nationally, must be tacked in groups and not individually.

Dr. FRIEL, in answer to questions, said he had never seen any untoward results from the introduction of the diastolisation bougie by a mother; the bougie was usually left in for about five minutes.

PARIS

(FROM OUR OWN CORRESPONDENT)

PROF. LÉON BERNARD

THE death of Léon Bernard at the comparatively early age of 62 was as sudden as it was unexpected. The fatal extension of a dental abscess was a matter only of hours. He combined many qualities. Laboratory worker, clinician, administrator, diplomatist, and orator, he excelled in all these fields, and knew how to fuse his many and great gifts in a forceful and convincing personality. He was at one time professor of public health, and some of his friends wondered why he should have abandoned this chair for that of the newly created chair of tuberculosis. On the face of it, he moved from a wider to a narrower sphere, but whatever public health may have lost by this change, it is certain that the cause of tuberculosis in France owes much of the efficient promotion it has enjoyed during the past decade and more to Léon Bernard. He was tireless. Even at table, on the place where others would put their bread, he placed his telephone, and it was a marvel to those who dined as well as worked with him how ceaseless his activities were; for he remained throughout life a practising physician with an influential clientele and with his own clinic.

PROF. LÉON BERNARD

While Grancher blazed the trail for the welfare of the child exposed to infection at home, providing for his adoption by healthy foster parents, preferably in the country, Léon Bernard went still closer to the root of the matter by organising a system by which the infants of a tuberculous parent could be taken into a healthier environment without the home being

broken up. He argued shrewdly that if the tuberculous parent instead of the threatened child be sent away, the home was liable to be broken up by the healthy consort forming new ties in the absence of the tuberculous husband or wife. Léon Bernard gave expression to his appreciation of the Papworth system by introducing it, in a slightly modified form, into France. At the Laennec Hospital in Paris he surrounded himself by a distinguished staff of specialists representing every aspect of tuberculosis work. He was an original member of the Health Committee of the League of Nations, and his association with the International Office of Public Health in Paris brought him many international contacts. Although he scarcely understood spoken English, he frequently visited this country and had a French which nearly everyone understood. A few years ago he succeeded Roux of the Pasteur Institute as president of the Conseil Supérieur d'Hygiène Publique —the highest administrative medical honour in France. He was also secretary to the International Union against Tuberculosis as well as the guiding force in the French National Tuberculosis Committee. He was also a close friend of the Red Cross, both at home and abroad, and his services as an administrator were often required by the League of Red Cross Societies. Not exactly a deep thinker, he had an uncanny ability of sizing things up in essentials and of expressing them faultlessly. A bibliography of his publications would run to several pages. Many of his more recent publications were associated with the names of younger colleagues whose work he had done much to inspire.

His funeral on August 22nd was impressive owing to the number of corporate bodies represented there in their last tribute to a great benefactor. A more permanent memorial may be the establishment in Paris of an international school of advanced studies in hygiene maintained by the State but placed under the authority of the health organisation at Geneva. The project has not gone beyond the formalities of precedure and constitution, but one day it may materialise and be a testimony to Bernard's broad international outlook.

PROBLEMS OF FOOD

THE object of the Food Investigation Board is the improvement of our food-supply. In the 1933 report, Sir Joseph Broodbank, the chairman, says that the Board has always attached the greatest importance to investigations which, putting aside immediate practical needs, aim at increasing the present meagre knowledge of the properties of foodstuffs. Much of the work embodied in the latest report,[1] however, has an immediate application, and there is little to be found in it which does not foreshadow practical advantage in the future.

Fish—Fresh, Thawed, and Pickled

At the Torry research laboratory experiments have been pursued into cold storage of different species of white fish. Fillets of haddock, cod, whiting, gurnard, plaice, and lemon sole were sealed in separate cans, frozen in brine at −20° C., and stored at −21° and −12°. After storage for 4, 6, 8, or 12 weeks the fish were thawed and smoked to a "pale" cure; they are fish which, when fresh, give an equally good cure as regards gloss and translucency, and these characteristics were used as criteria in assessing the effects of cold storage. After six weeks' storage at −21° all the cures were as good as fresh cures, but after 8 to 12 weeks there was a noticeable falling off, except on the part of the lemon sole; at −12° the rate of change was more rapid, all the fish—except the indefatigable lemon sole—giving a cure inferior to a fresh cure after four weeks' storage. The lemon sole, after 12 weeks at −12°, gave a cure that was nearly equal to a fresh cure.

Other work of the laboratory included an investigation of the keeping quality of frozen haddock after thawing. The freshly trawled fish were frozen in brine at −21°, and stored at that temperature for varying periods, ranging up to 6 weeks; they were then thawed in ice. It was found that in most cases thawed fish, after freezing in brine, had browner gills, browner blood, and slightly browner flesh than fresh fish; and that the flesh was usually slightly softer than that of fresh fish for the same duration of storage in ice up to 5 days, though after that there was little difference between the two. But these deviations from normal appearance do not indicate an inferior quality, though there might be some difficulty in marketing the fish in the unfilleted state until this has been explained to the buyers. Neither fresh nor thawed fish acquired the putrefactive smell of stale fish until they had been 12 days in ice, when the characteristic odour was observed to the same extent in both. When thawed fish is to be smoked, smoking should follow immediately upon thawing if a first-class cure is to be obtained.

A short section on the curing of herrings deals with the possibility of obtaining a mild cure which will keep. A hard cure is produced by packing herrings in saturated brine and solid salt. The observers produced a lightly salted brand by soaking herrings in brine without the addition of solid salt. They were undeniably palatable, and the flesh was not desiccated as it is in a hard cure, but after 12 days at a temperature of 10° to 15° C. they were also unmistakably sour, and after 28 days putrid. When kept at 0° C., however, they were sound after 12 days, only slightly sour after 28, and uneatable after 39. At −6° C. they remained sound up to 80 days and are being kept for still longer periods.

Experiments on the growth of micro-organisms indicate that temperatures below −6° C. must be employed if fish is to be kept bacteriologically fresh for any length of time. Studies of the vitamin A in halibut-liver oil show a maximum average content in the spring and a smaller rise in the autumn, in each case following, by about a fortnight, a period when diatoms are especially abundant in the sea.

Some Habits of the Apple

Apples have held a reputation as a mystery fruit since the creation, and they evidently appeal to the curiosity of the Board, for a considerable part of the report is given up to their vagaries. Their study is complicated by the fact that no two strains of apple seem to behave alike. At the low temperature research station the influence of the atmosphere composition upon the incidence of the climacteric in apples has been investigated. The climacteric is "the irreversible change . . . which ushers in the senescent phase of life, and which is accompanied by a marked increase in respiratory activity." Post-climacteric apples rather unfairly evolve a substance which induces the climacteric in other apples which have not yet reached the stage at which it is auto-induced; so that when apples are stored together, as soon as one reaches the climacteric the whole

[1] Report of the Food Investigation Board for the year 1933. H.M. Stationery Office. Pp. 248. 4s.

company are affected, whereas, if similar apples are stored in separate containers the self-induced climacterics are spread over a considerable period. As an early climacteric is associated with a short storage life it is important to find some method of storage by which the climacteric is delayed. The observers found that when Bramley's seedling apples—the most important English cooking apples—in the late pre-climacteric stage were exposed to an atmosphere of pure oxygen at 18° C. the incidence of the climacteric was considerably accelerated, but that subnormal concentrations of oxygen delayed the climacteric. Studies have also been made of the respiratory activity of apples in the presence of atmospheres containing the normal 21 per cent. of oxygen, but variable quantities of carbon dioxide. Sturmer pippins were used, and it was found that, with apples in the post-climacteric phase, at 10° C., respiratory activity was depressed by a 5 per cent. concentration of carbon dioxide in the atmosphere, and depressed still further by 10 per cent. In the pre-climacteric phase carbon dioxide seemed to exert no marked effect upon respiration, but it had the effect of delaying the climacteric considerably—a finding which naturally has an important bearing on the gas-storage of fruit.

Problems of gas-storage are also being studied at the Ditton laboratory, where routine trials have been made with monarch, Cox's orange pippin, Blenheim orange, and Worcester pearmain. The divergent behaviour of different strains of apple may be noticed in their results, but at least there is enough uniformity for the observers to state that for these four varieties of apple the best results were obtained when both the oxygen and carbon dioxide content of the atmosphere were low—usually in the proportions of 2·5 per cent. of oxygen and 5 per cent. of carbon dioxide. In dealing with Cox's orange pippins the development of the characteristic flavour is the chief consideration. The observers found that though gas-storage retards the development of this flavour it does not destroy it; when the apples had been stored under the favourable atmospheric conditions described above, the full flavour did not develop until they had subsequently been kept in air at room temperature for several days. The importance of these gas-storage experiments can be estimated from the fact that there are now 12 commercial gas-stores for apples operative in England, and several more are being built. They have been designed primarily for Bramley's seedlings; with these the optimum storage atmosphere can be obtained by allowing the apples themselves to generate the necessary carbon dioxide, its amount being controlled by ventilation. Unfortunately this is not a plan which can be followed with most varieties of apple, but the problems of construction which the gas-storage of various strains involves are now being studied.

An inquiry into the vitamin C content of canned apples, carried on at the low temperature station, showed that the removal of the peel before steaming was responsible for a great loss of vitamin during canning. Kohman, Eddy, and Carlsson had previously shown that apples soaked in 2 per cent. salt solution for 18 hours before canning retained their vitamin; but this process makes the canned apples rather insipid and salt to the taste. The workers at the research station found that if apples were cored but not peeled, immersed for a short time in brine to keep them from turning brown, steamed on a hair sieve for 3 or 4 minutes, canned, and then cooked, in the can, for 25 minutes in boiling water, the finished product contained about as much vitamin C as the unpeeled raw apple. Canned apples are not a thing one hears of people eating much in this country, but it is gratifying to know that they can be so efficiently prepared should the demand arise.

Curing of Bacon

Experiments on bacon-curing have been continued at the research station, and in view of the reorganisation of the pig industry a special study has been made of tank curing. Tank pickle contains 25 to 28 per cent. of salt and from 3 to 4 per cent. of saltpetre, according to the recipe followed, but before it can be employed for curing it must be matured by using it to salt heads or small pieces of meat. When mature it contains, in addition to salt and saltpetre, a trace of nitrite, and hæmoglobin and proteins which have diffused out of the meat. Mature pickle can be used over and over again; when a batch of sides is removed from the tank the pickle is found to be more dilute and to have increased in volume, and the strength has to be maintained by the addition of salt and saltpetre before each new batch of sides is put in. The concentration of nitrite and proteins remains fairly constant.

An investigation was also made into the penetration of salt, both by tank curing and dry-salt curing. The electrical resistance decreases as the concentration of salt increases, and can accordingly be measured. In curing Wiltshire sides the interior of the lean meat is injected with pump-pickle before being salted or immersed in the tank. The salt was found to penetrate far more quickly in the pumped sides than in unpumped controls, both in dry-salt and tank curing, and moreover the salt was much more evenly distributed in the mature bacon in sides which had been pumped. Penetration of salt was much more rapid in a lean than in a fat side. Experiments on gas-storage were also carried out on pork and bacon; a side of tank-cured bacon, stored at 0° C. for 18½ weeks in an atmosphere of carbon dioxide, when exhibited in an unsmoked state at Smithfield was pronounced to be hardly distinguishable from fresh bacon. Other sides, A_1 and A_2, from the same pig were dry-salted and stored unsmoked at −3° C.; another pair, B_1 and B_2, were frozen at −35° C. and stored at −10° C. Sides A_1 and B_1 were stored in air, A_2 and B_2 in carbon dioxide. After 8 months they were all taken out of storage and smoked. Both A_1 and B_1, stored in air, were badly dried out and the fat was rancid. There was no rancidity in A_2 and B_2, and they were indistinguishable in appearance from fresh bacon.

Other activities reported by the Board are concerned with respiration in the potato, storage of soft fruits, bacteriological problems of storage, disease in fruit, post-mortem changes in the haddock, biological engineering and engineering problems connected with apparatus, and investigations on meat and its storage. Gas-storage has proved as valuable for meat as for other perishable foodstuffs, and enables meat to be stored at temperatures which preclude the formation of ice in the tissues—a problem of cold storage which has long exercised the trade.

Though the results of many of the inquiries have a universal application, others—notably the investigations on fruit—have little bearing on the problems of overseas producers who are working under quite different conditions. Each area of production must undertake its own research—it cannot be done elsewhere. "Work of this kind," Sir Joseph Broodbank says, "is slow, costly and unimpressive, but it is necessary."

PUBLIC HEALTH

ADULT SERUM IN THE CONTROL OF MEASLES

By Elwin H. T. Nash, M.R.C.S., D.P.H.

MEDICAL OFFICER OF HEALTH, HESTON AND ISLEWORTH; CONSULTING PHYSICIAN, MOGDEN ISOLATION HOSPITAL; AND

A. E. Gammie, M.B.

MEDICAL SUPERINTENDENT TO THE HOSPITAL

During the biennial epidemic of measles which began in November, 1933, an unusually large crop of cases admitted to the Mogden Isolation Hospital proved to be incubating this disease while suffering from another. Accommodation at the hospital is short, and, as it will be so until the newly formed joint board for South-West Middlesex commences to function, it is important to keep the wards fully open. Steps were taken, therefore, to limit the spread of measles within the hospital by protecting susceptible children.

At first, thanks to Dr. R. A. O'Brien of the Wellcome Physiological Research Laboratories, a few doses of convalescent serum were obtained. Five doses of adult serum were also obtained from Dr. D. N. Nabarro at Great Ormond-street Hospital. Soon, however, we had to look for a source of supply of our own, and the District Commissioner of Boy Scouts was asked to obtain volunteer donors of blood among the rover scouts who had had measles. Three volunteered at once, and about 1200 c.cm. of blood were obtained. This was sent to Dr. O'Brien who kindly carried out the necessary tests and put the serum up in ampoules ready for use. When the stock ran low another appeal was made, and three more volunteers came forward with equal readiness. This time a rather larger quantity was obtained.

It will be noted that the doses of adult serum have as a rule been moderate in comparison with the dosage recommended in the L.C.C. report [1] on the measles outbreak of 1931–1932. No sliding scale of dosage according to age was used by us. The average dose given was about 10 c.cm. Possibly our younger class of donor may be found to give a more potent serum, but we feel that it ought to be possible, when protecting children brought up under ordinary urban conditions, to count upon some degree of immunity gradually developing with age, and thus to avoid giving the larger doses recommended for older children. No attempt was made in any of the cases to produce a modified attack, as especially in the hospitals it was desirable to secure complete protection. All injections save one were given on the third or fourth day of exposure.

Table I.—*Convalescent Measles Serum*

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	1 6/12	4	22/11/33	Protected, but had measles 6/1/34.
F.	2½	5	22/11/33	Protected.
M.	7½	6	22/11/33	,,
M.	12	10	22/11/33	,,
M.	1	5	6/1/34	,,
M.	7	5	30/12/33	,,
M.	5	5	30/12/33	Modified measles 12/1/34.
F.	2	5	15/3/34	Protected.
F.	5	10	6/11/33	,,
M.	3½	6	6/11/33	Typical measles 21/11/33.
M.	4½	8	7/11/33	Protected.
M.	3	5	22/11/33	,,
F.	6	10	6/11/33	Protected, but had measles 25/12/33.
F.	1½	5	6/11/33	Protected.
M.	6	10	6/11/33	,,
F.	11	10	30/5/34	,,
M.	5 11/12	5	30/5/34	,,

Table II.—*Adult Measles Serum*

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	10/12	6	22/11/33	Modified measles 6/12/33.
F.	7 3/12	14	22/11/33	Protected.
M.	3 6/12	12	22/11/33	,,
M.	2	10	18/1/34	Modified measles 20/2/34 (note date*).
F.	5	10	18/1/34	Protected.
M.	4	10	15/2/34	,,
M.	4	10	15/2/34	,,
F.	3	10	22/2/34	Modified measles 14/3/34.
M.	14	10	15/2/34	Protected.
M.	2	10	1/3/34	,,
F.	5	10	1/3/34	,,
F.	5 6/12	10	22/2/34	Modified measles 27/2/34 (note date).
F.	3 6/12	10	14/3/34	Protected.
M.	3	10	14/3/34	,,
M.	4	10	15/3/34	,,
F.	4	10	14/3/34	Modified measles 23/4/34.
M.	12	10	11/4/34	Protected.
F.	3	10	15/4/34	Modified measles 23/4/34.
F.	5	15	26/4/34	Modified measles 4/5/34.
M.	12	15	26/4/34	Protected.
M.	3	15	26/4/34	Modified measles.
M.	5	12	22/11/33	Protected.
M.	5	20	2/6/34	,,

* In this the period of protection under our definition was exceeded by three days, but the case is classed as unprotected but modified.

Table III

Sex.	Age.	Dose in c.cm.	Date given.	Result.
F.	14/12	10	4/5/34	Protected.
F.	6	10	19/2/34	,,
F.	11	12	19/2/34	,,
F.	9/12	7	19/2/34	,,
M.	3/12	3	24/2/34	,,
M.	4	10	1/3/34	,,

The tables show the results obtained in the individual cases. The cases listed as modified are those in which the patient was never really inconvenienced by the disease, having little or no rise of temperature or catarrh, and a pale rash.

During the outbreak in the children's ward of the Hounslow General Hospital, adult serum was used in six cases. All were completely protected. The ward was not closed (Table III.).

Doses of adult serum were also given to three children in private practice, and a dose of convalescent serum to one. All were protected. These cases were not isolated from the source of infection.

Principally as a result of the action of the rover scouts it was possible for the first time on record to keep the isolation hospital and the children's ward open throughout a severe epidemic of measles. During the previous outbreak of measles one of the scouts had to be refused admission to the hospital for acute appendicitis as the ward was closed on account of measles.

Each batch of rover scouts was presented by the mayor at a public council meeting with an illuminated certificate of appreciation over the official seal, and we wish personally to place on record our own indebtedness to them. Our thanks are also due to Dr. C. D. Meadowcroft for taking the blood from the volunteers.

[1] London: P. S. King and Son. No. 2996. 2s. 6d.

SUMMARY

Taking as a standard of complete protection freedom from the disease for one month the results are as follows:—

Convalescent Serum (18 cases).

Complete protection (1 measles six weeks after injection)	16
Complete failure	1
Modified attack	1

One boy was exposed to infection at home five weeks after injection and completely protected.

Adult Serum (32 cases).

Completely protected (1 modified case five weeks after)	25
Modified cases	6
Modified case five days after injection—i.e., too late for full protection to be likely	1

Standards of Malnutrition in School-children

COUNTY school medical officers have much opportunity of assessing malnutrition in elementary school-children. Dr. W. G. Booth, reporting to the Lincoln (parts of Holland) council gives a comparative table which shows unmistakably the immense improvement of average physique in his area in the past twenty years. He is in a strong position, for it was in his county that Dr. A. W. Tuxford established his well-known standards in the three years preceding 1914. Exactly similar measurements and calculations have been carried out for 1933 by Dr. N. J. England.

Age.	Height (inches).		Weight (lb.)	
	1910–13.	1933.	1910–13.	1933.
Boys 5½	41·4	43·0	39·5	42·4
Boys 12½	55·4	56·8	74·9	80·1
Girls 5½	41·0	42·9	38·3	40·5
Girls 12½	56·2	57·7	76·5	81·4

The average boy is now 4 per cent. taller and 7 per cent. heavier than 20 years ago; the girl's increase is little less. Dr. England remarks that, judged by the standard of to-day, the normal child of 1913 would be regarded as a case of malnutrition (at all events undersized). For this alteration in physique Dr. Booth can find many causal factors. First the wages of the agricultural labourer are about twice as high as in 1914, while the cost of living is not 50 per cent. up, and the average family is smaller. Yet the present-day labourer has little enough money, for the prices of foodstuffs in his area are higher than in industrial areas, a fact which (Dr. Booth adds) "lends considerable support to the view that the rental of agricultural labourers' cottages must be kept at the lowest possible level if the nutrition of the family is not to suffer." No credit can be given to the school medical service for the change, since the improvement in physique takes place before the children attend school and is only maintained during school years. He does not however discount the influence of education on the mothers who have been led to a realisation of the importance of proper feeding, while the deeper interest in the welfare of children by all classes of society "has had a far-reaching effect upon wages, housing, sickness and every form of communal advancement." Much of this enlightenment, we cannot help feeling, has had its origin in the knowledge of health that has developed in the schools as a result of the existence of a school medical service.

In Cumberland Dr. Kenneth Fraser says that investigation does not reveal increased incidence of malnutrition. The number of cases reported in 1933 was 137 as opposed to 45 in 1932, but he does not think these figures are of great significance. He writes:

"In the first place, out of a school population of something like 25,000, the percentage increase is very small indeed; but, apart from that, when any particular subject is in the air more cases are classified accordingly than under normal conditions. This is a psychological fact from which the school medical officer is not free any more than is the man in the street. The trouble of the whole matter, of course, is that malnutrition is not a definite disease like diphtheria or deafness, but is largely a matter of individual opinion. There are no standards of comparison, and when one says that there is no increased incidence of malnutrition one is saying no more than that the physical appearance of the children, their height and weight, their muscular tone, their colouring, appear more or less normal."

Later in the report however he admits that the evidence is not altogether satisfactory, for there has been an increase in the incidence of rickets in young children and in the number of cases of chronic inflammation and ulceration of the eyes—examples (he adds) "par excellence" of the results of malnutrition. That the children have stood the period of economic distress as well as they have is largely due to provision of extra nourishment and milk and to supervision by welfare centres and other agencies.

Dr. C. Franks (Durham) has an interesting note on the "time lag" between a return to employment and any improvement in the nutritional condition of the family. Dr. O. Sullivan (Northumberland) has found that, while defective feeding in adolescence may leave a legacy of physical impairment which persists throughout life, a striking rectification may occur after puberty; these years may, he suggests, be regarded as a "period which affords great possibilities of physical regeneration, especially if the tide of growth is taken at its flood."

In Hampshire Dr. H. L. Cronk reports in detail on 110 cases of malnutrition, of which the causes were found to be per cent.: fatigue and inadequate rest 20, recent illness 13, incorrect diet 18, oral sepsis 15, unknown 33. In four cases only could it be attributed to poverty. In East Sussex Dr. W. R. Dunstan has for several years made a special study of the ratio between heights and weights of children. He thinks that by the use of tables (and he is a recognised authority on the method) the actual weight at any height can be compared with the standard weight and thus wide variations from the normal are easily detected and a "preliminary sieve" is obtained. In his view any child with weight as much as 7–9 per cent. below the normal should be weighed quarterly and if the deficiency is over 10 per cent. the case should receive special investigation.

In the Isle of Ely Dr. T. C. Lonie has carried out a statistical survey of height, weight, and nutrition, using the tables of Tuxford, Dunstan, and others, and finds that both in height and weight the children of the area are above the standard. He considers that for the measurement of nutrition, comparative tables of heights, weights, and age are valuable, but that a satisfactory height-weight ratio is not enough. The well-nourished child, he says, has also other characters.

"His posture and general physique are good, his body well covered but not fat, his muscles firm, his skin elastic,

and of good texture, his hair smooth, glossy and of good amount, his organs sound and circulation good; clear of eye and with a bright expression; alive and alert in body and mind. It will be seen, therefore, that there are many respects other than those of height or weight wherein a child may fail to reach the ideal of fitness, and since each of these particulars is capable of being modified by diet, those children who fail to reach the standard may be considered to suffer in some respects from malnutrition and as such to be in need of treatment."

In Kent Dr. J. Selfe divides the under-weight child into seven classes: (1) Normal thin child; (2) Indigestion; (3) Throat infection; (4) Rheumatism; (5) Tuberculosis; (6) Chronic (non-tuberculous) chest trouble; (7) Diabetes and *B. coli* pyelitis. It is certainly important that all who see under-weight children should remember how many other reasons besides lack of food there may be for deficiency in weight, not forgetting the constitutionally thin child who has his own optimum weight.

In Notts Dr. P. H. Deeny has carried out a thorough investigation of 461 children reported by teachers as possibly suffering from malnutrition due to underfeeding. For height-and-weight ratios he used Tuxford's formulæ, not of course gauging the presence or absence of malnutrition by these alone. He found no evidence of widespread malnutrition due to lack of food; in a school population of 49,000 there were only 29 such cases and in these the condition was aggravated by fatigue and ill-chosen diet. The need for instruction of parents in food values appears to him urgent.

Dr. J. N. V. Potts (Yorks, West Riding) finds the Quetelet standard $\frac{100W}{H}$ is the most trustworthy index of malnutrition but not by itself adequate as a guide; his practice is for two examiners to work over the same children to check standards and he has found that the agreement is remarkably close.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 18TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1973; diphtheria, 992; enteric fever, 31; acute pneumonia (primary or influenzal), 368; puerperal fever, 45; puerperal pyrexia, 103; cerebro-spinal fever, 10; acute poliomyelitis, 18; acute polio-encephalitis, 6; encephalitis lethargica, 7; dysentery, 11; ophthalmia neonatorum, 75. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on August 27th–28th was as follows: Small-pox, 0; scarlet fever, 1203; diphtheria, 1399; measles, 415; whooping-cough, 266; puerperal fever, 20 mothers (plus 7 babies); encephalitis lethargica, 269; poliomyelitis, 4; "other diseases," 261. At St. Margaret's Hospital there were 16 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 12 (2) from measles, 3 (0) from scarlet fever, 12 (1) from whooping-cough, 30 (4) from diphtheria, 49 (13) from diarrhœa and enteritis under two years, and 12 (3) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the only death from enteric fever. Whooping-cough was fatal in 5 cases at Liverpool. Liverpool also reported 5 deaths from diphtheria, Birmingham 4. Birmingham with 7 showed the highest deaths from diarrhœa, Liverpool following with 4.

The number of stillbirths notified during the week was 264 (corresponding to a rate of 38 per 1000 total births), including 45 in London.

MEDICINE AND THE LAW

Coroner's Jury and Witness

AT a Hammersmith inquest this week, where a death apparently due to a traffic accident was being investigated, the deputy coroner found himself obliged to discharge the jury and to adjourn the proceedings to another day. This was because one of the witnesses had been seen talking to members of the jury outside the court. A solicitor's clerk reported the irregularity to counsel engaged in the case, and counsel protested to the deputy coroner. It was not clear that the witness had been practising advocacy or indeed doing more than pass the time of day in conversation, but the incident was rightly described by the deputy coroner as capable of unfairness. Without attributing any sinister intention to this particular witness, we can all appreciate that jurors ought to give their verdict upon evidence heard in open court and not otherwise. Lately, it is believed, the authorities at the Central Criminal Court have been disquieted by suspicions that persons have attempted to tamper with juries at criminal trials; if the fears are well founded, it is a grave matter. Yet, as legal historians have satisfied themselves, it was not always the rule that juries must hearken only to the evidence of publicly examined witnesses. Our jury system traces its pedigree back to the assembly of neighbours who in Norman times were made to give answers on oath out of their own knowledge to questions (usually relating to revenue) administered to them by officers of the Crown. Somehow, by steps which are not conspicuous, a declaration based on personal knowledge of local events was converted into a verdict based on the formal evidence of witnesses. In 1670 Chief Justice Vaughan laid down in Bushell's case the rule that a jury could not be punished for giving a perverse verdict contrary to the evidence. One of his reasons, he explained, was that the jury may have personal knowledge which will assure them that what they hear in court is untrue. Gradually, during the eighteenth century, the modern principle was established. By 1824 a text-book writer was able to state confidently that a juror could not give a verdict founded upon his own private knowledge, although in 1836 (in R. *v.* Rosser) Baron Parke was obliged to admit that it was impossible to prevent a jury in a criminal case from making use of its general knowledge. The coroner's jury seems to provide a missing link in the development of the modern blank-minded juror from his predecessor who was specially selected because he already knew everything without hearing evidence. At any rate there is a curious survival in the oath of the juror at an inquest as prescribed in the Coroners Rules of 1927 (following the Act of 1887 which in turn had followed much earlier precedents). He swears that he will "diligently inquire" and that he will give a true verdict according to the best of his skill and knowledge as well as according to the evidence. The language seems to be a relic of the ancient practice of the Norman period. Yet, inasmuch as coroners have long ago evolved a stabilised judicial technique of examining witnesses and of summing up their evidence to the jury, it is obvious that a juror at an inquest cannot nowadays be encouraged to prosecute his own inquiries outside the court or to discuss the case with a witness in an informal way.

CORRESPONDENCE

PUBLIC EXHIBITIONS OF CRUELTY

To the Editor of THE LANCET

SIR,—In your leading article of August 18th, entitled the Death Penalty and the Public, an interesting point is raised with regard to the influence of executions on the public at large. We read that

> "the sufferings of murderers and their families are still used for public entertainment [by the press] . . . and the sadistic element which is to be found in everyone, normal or abnormal, is regularly exploited in this way, in the name of the State and for the sake of large circulations."

Prima facie, such exploitation will probably strike us as undesirable, degrading, and calculated to increase those sadistic tendencies in all of us which we may deplore but cannot deny. Have we any real evidence, however, that such appetite does in fact grow by what it feeds on? Is it not rather that sadism tends to become canalised in channels which may be either superficially obvious or deeply hidden, and that sadists (made, like Jesuits, in the nursery) are a menace or an asset to society according as to how successfully their tension is released? If we consider the professional sadists (amongst whom I would include surgeons, butchers, and those who hunt the fox more than three days a week), we may, and indeed generally do, observe in them a certain grossness and blunting of the finer feelings, but we can hardly claim that they are any more cruel in their social relationships than, shall we say, the average film star or street hawker, whose professional rôle is (presumably) to please.

The present age has brought to a fine art the practice of being kind only to be cruel, and by the studied removal of those outward and visible signs of brutality and violence, in the witnessing of which the average man can release his sadism, we are simply forcing personal and mass cruelty to find other and often incalculable means of satisfaction. It would perhaps be far-fetched to diagraph the decrease in bear-baiting and cock-fighting against the overwhelming increase in divorce, but there can be little doubt that the present century, for all its apparent dislike of open brutality, has witnessed a world war and, in a highly civilised country, a series of official pogroms and murders almost without parallel since the Middle Ages, because in each case the community was psychologically "ripe" for such things to happen. So far, one comparatively harmless outlet has been left unobstructed, and the reading public (with that unerring instinct with which a child starved of sweets makes up for them with bread) has very properly indulged in an orgy of murder, horror, and "war" literature. There is a kernel of truth in the comment:

> The War we suffered not so long ago
> Now makes an excellent Grand Guignol show,
> Which earnest youths enjoying cheap sensations
> Call "Propaganda for the League of Nations."

Until we can produce a change of heart in future generations, not by emasculating films or by hearing murder trials in camera, but by a saner and more sympathetic attitude to the infant and child, and by such long-period psychological experiments as those suggested by Dr. Edward Glover (in his book, "War, Sadism, and Pacifism"), we should probably do better to allow the comparatively harmless indulgence of sadistic appetites in public exhibitions of cruelty than to attempt to suppress them. Meanwhile, I for one shall continue to read Edgar Wallace and to attend the all-in wrestling matches at the "Ring" from a stern sense of duty, in the hopes that by so doing I shall save my unconscious the necessity of clapping on the fomentations dangerously hot, or of strangling my last duchess, or of causing my children's feet to stumble at the head of the cellar stairs. And though it is doubtless too late to put back the clock, I should warmly welcome the reintroduction of public executions that the watchers might be purged through pity and horror.

I am, Sir, yours faithfully,

August 20th. EGENS MAURIS JACULIS.

HYPEREMESIS GRAVIDARUM

To the Editor of THE LANCET

SIR,—In her admirable Ingleby lectures on the toxæmias of pregnancy (in your issues of August 11th and 18th) Dame Louise McIlroy describes hyperemesis gravidarum as a symptom of severe toxæmia, to be distinguished from frequent or prolonged vomiting in early pregnancy, which she ascribes to carbohydrate deficiency associated with an anxiety neurosis. She has, however, brought forward no evidence to shake the belief I first expressed twenty years ago that excessive vomiting beginning in early pregnancy is always due to hysterical exaggeration and perpetuation of the morning sickness which occurs in 50 per cent. of normal women, and that there is no dividing line between such cases and hyperemesis gravidarum, the so-called pernicious vomiting of pregnancy. The symptoms and signs which are supposed to indicate the presence of profound toxæmia are, I believe, simply the result of starvation and dehydration, and the artificial termination of pregnancy only acts by suggestion, as the patient naturally expects to recover when what she regards as the cause of her vomiting is taken away.

Dr. J. S. Fairbairn in supporting my views on the subject in 1920 stated that he had not required to terminate pregnancy for vomiting during the previous ten years, and Dame Louise McIlroy has had the same experience in the last ten years. I feel sure that in both cases this is due to the success of the psychotherapy practised in the early stages, in the absence of which severe cases of hyperemesis would have been very much more common, as no less that 60 fatal cases occurred in England in 1930 compared with 38 in 1910 and 34 in 1920. I fancy that Dame Louise really agrees with me, though she has not the courage of her convictions, as she concludes her discussion of hyperemesis gravidarum by saying that success in treatment depends upon "the assurance given to the patient that she has nothing to fear and that she will get well," and that without psychological treatment dieting would be ineffectual.

I feel sure that the psychotherapy is the only essential part of the treatment. I cannot understand the object of giving a patient, who is already suffering from the effects of starvation, nothing by mouth for 24 or 48 hours, nor can there be any need for gastric lavage which can only act by suggestion in the absence of pyloric obstruction or severe gastritis. I doubt whether there is ever any need for special dieting. Twelve years ago I reported in your columns (THE LANCET, 1922, i., 528) the following case:

> A woman of 32 was admitted into hospital at the end of the third month of pregnancy. She had vomited all her food since the third week and during the last ten days had retained no fluids. She was very emaciated, her skin was dry and inelastic, and her tongue was dark brown and very dry. Her pulse was 136. The ammonia index of her urine was 28 compared with the normal of 5;

according to Whitridge Williams an increase to 10 per cent. "affords an urgent indication for the prompt termination of pregnancy." In spite of being given fluid by rectum and none by mouth the vomiting persisted. She told me that when she began to vomit her father had said: "You will have a bad time of it, as your mother vomited all the time she was carrying you." I explained to her that there was no real reason why she should have continued to vomit after the first six weeks, but that what her father had said had suggested the idea that the vomiting would continue, and such a suggestion, coming at such a time, was all that was needed to lead to the condition she was now in. We talked about her illness for ten minutes, at the end of which I had succeeded in convincing her that she would not vomit again. I then watched her eat some toast and tea which she had chosen for her first meal. She felt no inclination to vomit. She had a good supper, but vomited her breakfast next morning. She was then transferred to my ward, and had meat and pudding for dinner which she kept down. Except for a slight tendency to vomit after breakfast a week later she had no further trouble, and left the hospital a month after admission having gained 16 lb. in weight. The ammonia index fell rapidly to normal, and the diacetic acid, which had been present in large quantities, disappeared. The pregnancy ran a normal course and a healthy baby was born at full term.

Only those who have watched such a case as this can realise the amazing way in which all signs and symptoms of severe toxæmia disappear when the patient is persuaded to take and to retain an adequate supply of food and fluid.

I am, Sir, yours faithfully,

New Lodge Clinic, August 26th. ARTHUR F. HURST.

THE SURGEON AND THE GUNMAN

To the Editor of THE LANCET

SIR,—The facts with reference to the treatment by Dr. Clayton May of Dillinger are as follows. Dr. May was not sent to the Penitentiary for failure to report the dressing of Dillinger's wound. He had a perfect right to do this. But after dressing the wound he took Dillinger and two associates of the gunman to a private apartment and kept them there for a week while the authorities were hunting for them. He was sent to the Penitentiary for aiding a criminal to avoid arrest, and the housekeeper of the apartment was sent to the same place on the same charge.—I am, Sir, yours faithfully,

FRANKLIN R. WRIGHT, M.D.

Minneapolis, U.S.A., August 17th.

MEDICINE AND DENTISTRY

To the Editor of THE LANCET

SIR,—The suggestion made by Mr. Meynell Pearson in your issue of August 11th (p. 334), that the alleged shortage of dentists should be made good by newly qualified doctors gradually learning the elements of dentistry by association with dental surgeons in their private practices, ought not to pass unchallenged. It is true that the Dentists Act, 1921, allows doctors whose names appear on the Medical Register to practise dentistry. Since dentistry must be regarded as a special branch of medicine it would have been illogical to debar them. But its highly technical nature makes it incumbent on the doctor who wishes to practise as a dentist to take out a course of study at a dental school. He need not take the L.D.S. examination; on the other hand, unless his name appears on the Dentists Register he would be under a grave disadvantage, for he would not be entitled to undertake any work for members of approved societies—and this work forms an increasingly important proportion of the practices of the majority of dentists.

The course for the L.D.S. covers four years. A doctor by virtue of his medical qualification is exempt from the study of general subjects, such as anatomy, surgery, and medicine, and from examination in those subjects. He is only required to work at a dental school for two years and to take the examinations in dental subjects. As a teacher and examiner for many years I can assure Mr. Pearson that a doctor who wishes to take up dentistry has to work hard during these two years in order to attain a standard of technical ability sufficient to pass his examinations and to practise dentistry with any hope of success. Is it likely that the casual crumbs of knowledge which could be picked up from an "established" dentist, presumably in busy practice, could turn a doctor into a dentist capable of carrying out his work as such efficiently and with benefit to the public? If so why not revert to the old system of apprenticeship?—I am, Sir, yours faithfully,

Brook-street, London, W., August 24th. A. T. PITTS.

DOES THE PUNISHMENT FIT THE CRIME?

To the Editor of THE LANCET

SIR,—I should like to support Dr. Phillipps's suggestion that the law regarding mental aberrations should be amended. I am a little sceptical regarding the theory of exhibitionism being due to enlargement of the prostate; it is, I think, more likely to be caused by the regression which occurs in senility. No matter what its cause, it is, as Dr. Phillipps says, intensely cruel to punish these old men—some of whom have lived distinguished lives—with imprisonment. Similarly, I believe that perverts, particularly if they are young, should have the benefit of psychological treatment before they are abandoned as hopeless, and even then prison does not seem the right place for them.

There is another side of the question of mental aberration which is equally neglected although equally important. I know of a case of a mentally unstable girl who accused a man of attempted rape. He was tried and sentenced to some months' hard labour. On a number of occasions afterwards this girl accused men of similar behaviour, but was found on each occasion to be virgo intacta. She is now suffering from schizophrenia.

The ignorance of some who should know better is appalling. I have a cutting of an inquest which occurred a few months ago. A man was found to have gassed himself while wearing woman's clothes. The coroner said "the condition in which the man was found was so abnormal as to be beyond his comprehension"—but it would not have been beyond the comprehension of a psychiatrist, and the necessity of having a consulting psychiatrist for such cases is obvious. If those who administer the law are so ignorant of psychological matters can we hope that those who make them will have any more insight? It seems that the only way to bring about a change in the law is for medical men to reiterate the necessity of changing it.—I am, Sir, yours faithfully,

London, August 28th. CLIFFORD ALLEN.

To the Editor of THE LANCET

SIR,—Dr. Phillipps has done good service in drawing attention to a very important and far-reaching subject. The condition exists and it should be recognised as a disease and not a crime. Many years ago, when I was sitting on the bench, a case convinced me of its existence. A man, probably in the middle sixties, married with a large family, and belonging to the lesser gentry class, was charged

with indecency in a public place. The charge was that, late at night, the accused had entered a urinal, had passed the penis through an opening in the eroded iron work, and stood with it there. Curiously the urinal was situated within a short distance of the police office. Attention was called to the circumstances and the man was charged at the next meeting of the magistrates.

The chief constable said he felt compelled to bring this case before the court; there were other cases known to him but he did not wish to mention them. A caution and a fine was inflicted. Within a short period the man was again charged with exposure. No doubt the sitting magistrates would double the fine and further threaten him. The family, however, realising the unfortunate position in which the head was placing them had a strict guard placed upon him, and he troubled the court no more. Before he was gathered to his fathers, to my surprise his family doctor asked me to see him in consultation. I give the bare facts of the case, without comment, in support of Dr. Phillipps's theory.

I am, Sir, yours faithfully,

August 18th. A MEDICAL MAGISTRATE.

GROUND TEMPERATURE AND EPIDEMIC DISEASE

To the Editor of THE LANCET

SIR,—The research on summer enteritis of children in which I assisted the late Dr. de Rienzi Morgan (Morgan's No. 1 bacillus) in 1906–07, established the fact that the epidemic did not appear until the 4-ft. earth thermometer registered 56° F. This fact may have a bearing on the recent outbreak of so-called Wimbledon throat, in view of the June average of 56·5° F. registered at Kew this year, being 1·4° F. above the normal. In a very courteous reply to my inquiry the Director of the Meteorological Office has sent me the mean values of ground temperature for England and Wales during the three summer months in conspicuously warm years, and these I hand on for the information of your readers.

Year.	June.	July.	August.	Average of three summer months.
	°F.	°F.	°F.	°F.
1899	55·8	59·6	62·1	59·2
1911	55·9	58·8	61·7	58·8
1921	55·8	60·1	60·4	58·8
1933	56·0	59·5	61·1	58·9
Normal.	54·7	57·7	58·8	57·1

I am, Sir, yours faithfully,

A. WHITE ROBERTSON.

Welbeck-street, W., August 20th.

A PROTEST

To the Editor of THE LANCET

SIR,—An article appears in the *Evening Standard* of August 14th in which my name is freely mentioned, with an old photograph incorporated. I should like to assure members of the medical profession that not one single word on this or any other subject has been communicated to any representative of the *Evening Standard* by myself or my two secretaries. I wish to make it quite clear that the article and photograph were published without either my knowledge or consent.

I am, Sir, yours faithfully,

Harley-street, W., August 18th. H. D. GILLIES.

MUSHROOM POISONING

To the Editor of THE LANCET

SIR,—The mushroom season is now with us and already one case of poisoning has occurred. In this connexion the observations of Fabre are worth recording. Briefly he states ("The Life of the Fly"; trans. by De Mattos) that in the district of Serigan where he resided for 30 years he never heard of a case of poisoning from mushrooms; that he attributed this immunity to the custom of the peasants of boiling all fungi in salt and water as a preliminary preparation; that the peasants ate indiscriminately all fungi, even those reputed to be poisonous; that he, together with friends, had proved the correctness of this by themselves eating the same poisonous fungi so treated. I met a man collecting "Jews' ears" in this neighbourhood who told me that they always soaked them in salt water before preparing them for the table.—I am, Sir, yours faithfully,

Easterton, Wilts, August 25th RICHARD LAKE.

IONISATION OF THE UTERUS

To the Editor of THE LANCET

SIR,—In your report (p. 376) of my paper read at the B.M.A. section of electro-therapeutics the substitution of "discharge from the cervix" for "discharge from the *uterus*" has altered the entire meaning of my communication. Treatment of the cervix by zinc or copper electro-deposition is a ready means of cure of discharge which originates from the cervix.

When the discharge comes from the body of the uterus treatment may be very difficult, because much patience and skill are required in order to pass the electrode up beyond the inflamed cervical canal. But this can be accomplished and, where no source of discharge is present beyond the uterus itself, cure is certain. I am, Sir, yours faithfully,

Devonshire-place, W., August 23rd. AGNES SAVILL.

ADMINISTRATION OF FLUID IN GALL-STONE SURGERY

To the Editor of THE LANCET

SIR,—Mr. E. R. Flint's article on the problems of gall-stones in your issue of August 18th concludes with the following astounding sentences:—

"I have had a considerable experience of this [the intravenous method], and for those cases which really require fluid I am certain it has very great advantages over any other parenteral method; 50 pints can be given without trouble in 4 or 5 days, and is for the most part retained, since there is no obvious sweating or proportionate increase in urinary excretion."

The following criticisms of these statements are so obvious that one is diffident about making them:

1. The only advantage which the intravenous method has over other methods is the rapidity of the addition of fluid—its main disadvantage is the extremely rapid elimination of fluid which has been added. It is also the only method by which such enormous quantities of fluid could be added to the blood stream, but such quantities are never necessary. If there is true dehydration five pints are as effective as fifty.

2. There are other paths for the elimination of water from the body besides the kidneys and skin.

3. Perception of "obvious sweating" is not an accurate method of estimating water elimination through the skin.

4. A more accurate method of assessing the amount

of retained fluid is to weigh the patient; if the "most part of 50 pints" were retained the patient would have gained about two stones in weight in five days!

5. If this quantity were retained the patient would show œdema of the tissues or heart failure, or both.

The low mortality rate in Mr. Flint's series of cholecystectomies must depend on his operative skill and not on such a preparation for operation. Moreover, such a procedure is obviously inadvisable in a group of people in whom there is a high incidence of myocardial degeneration.

I am, Sir, yours faithfully,

Derby, August 20th. DOUGLAS HUBBLE.

THE WOES OF A HOSPITAL RESIDENT

To the Editor of THE LANCET

SIR,—In view of the present interest in the harmful effects of noise, it is surprising that those responsible pay so little attention to the design of hospitals, for it is doubtful whether any other person is so much exposed to irritations and interruptions as a hospital resident. For some years, in my bed-sitting room, I have been exposed to a cross-fire of the following:—

Piano, loud-speaker-gramophone, door-bell, ambulance noises, another gramophone, howls from infants' wards, groans from men's ward, chapel organ on Sundays, nurses' rising bell, noises from kitchen and bathroom two yards away, comings and goings of all and sundry. Add to the above the strain of living with several others in crowded quarters and the futility of trying to sleep before midnight.

I doubt whether the usefulness of my reading is augmented thereby; certainly my contributions to medical thought are not as numerous, nor my value to my patients as great as they might be if only I could have quiet.

Oh, for a gas-oven and a shilling's-worth of sleep!

I am, Sir,

A FRENZIED CORRESPONDENT.

A BREACH OF CONFIDENCE

To the Editor of THE LANCET

SIR,—I should be grateful if you would bring to the notice of your readers the following instance of breach of confidence with regard to medical reports for compensation cases, as I feel that a very big principle is involved.

I had examined a man several times for an insurance company from the surgical point of view, and a colleague examined him from the medical side, both of us reporting fully and frankly to the company concerned. When I was recently asked to examine the man, I found to my surprise that he had in his pocket copies of my own and my colleagues reports, and also of the report of a surgeon who had examined the man for his own solicitor. He was thoroughly disgruntled about various remarks made by myself and my colleague, and extremely resentful that it should have been suggested that there was any connexion between the payment of compensation and his disability. Possession of the report of the surgeon who examined him for his own solicitor had had a particularly bad effect on him, and the moderate physical disability from which he suffers was enlarged to cover his whole mental horizon.

I took the matter up with the insurance company for whom I was reporting on his condition and they informed me that they had exchanged medical reports with the man's solicitor and that the solicitor had without their consent or approval handed them over to the man on his insisting on seeing them. The company wrote to the solicitor protesting at this breach of confidence, and apparently he admitted his error and expressed regret. I feel however that this is a glaring instance of breach of professional confidence and that the medical profession generally should be warned to insist that these reports are confidential, and under no circumstances, without the consent of the examining doctor or surgeon, should they be shown to the person examined.

I am, Sir, yours faithfully,

"CONSULTING SURGEON."

THE "GAS WEDGE" IN THE ÆTIOLOGY OF FISTULA IN ANO

To the Editor of THE LANCET

SIR,—In his letter on this subject in your issue of August 18th it surprises me that Dr. Young Kenny has omitted all mention of an obvious aggravating factor in the causation of what might be termed "rectal hypertension." I refer to that form of self-control imposed upon us by the demands of modern polite society. Indeed, Dr. Kenny's letter has revealed for us in a new way the wisdom of that popular saying:

"Where'er you be,
Let your wind go free."

I am, Sir, yours faithfully,

A. L. JACOBS.

University College Hospital, W.C. 1, August 21st.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. R. W. Mussen to be Surg. Comdr.

Surg. Lts. to be Surg. Lt.-Comdrs.: E. J. Mockler, C. H. Birt, and A. J. Burden.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lts. A. E. Williams to *Victory*, for R.N.B., and W. Gough to *Effingham*.

ROYAL ARMY MEDICAL CORPS

ARMY DENTAL CORPS

Lt.-Col. A. B. W. Rust, having attained the age for retirement, is placed on ret. pay.

The undermentioned Capts. to be Majs.: W. A. Cowden and D. A. McGeorge.

TERRITORIAL ARMY

Capt. R. McD. Cairns and Lt. S. G. French resign their commns.

ROYAL AIR FORCE

Dental Branch.—Flying Offr. H. Keggin is promoted to the rank of Flight Lt.

INDIAN MEDICAL SERVICE

Lt. J. M. Davidson relinquishes his prob. appt.

The undermentioned grant of leave has been made by the Commander-in-Chief in India: Maj.-Gen. T. G. F. Paterson, D.S.O., Deputy Director of Medical Services at Northern Command headquarters, on leave until October.

DEATHS IN THE SERVICES

The death is announced from London, Ontario, of Col. Claude Kyd Morgan, who was a distinguished member of the R.A.M.C. After graduating in medicine at Aberdeen in 1893 he entered the Corps in the following year, and shortly afterwards, being promoted captain, distinguished himself for plague duty in Poona. His work was highly commended in a resolution of the Government of Bombay. He did excellent service in the European war, was thrice mentioned in despatches, received the C.M.G. in 1916, and was an officer of the Legion of Honour. He was a member of the British Mission to Washington in 1918, and at the close of the war was appointed C.B. He was a Knight of Grace of the Order of St. John of Jerusalem. Col. Morgan was a Scotsman and was born at Inverkeilor, Montrose, in 1871; he married in 1905 Eleanor, daughter of the late Mr. T. H. Smallman of Ontario. She was created O.B.E. in 1919.

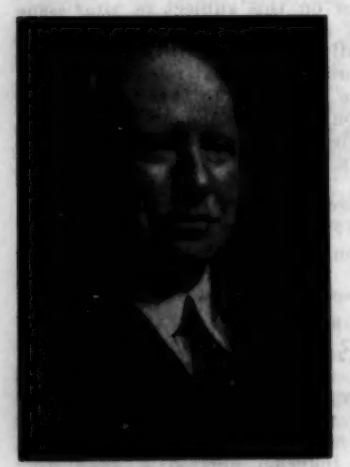
OBITUARY

GEORGES DREYER, C.B.E., F.R.S.

PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF OXFORD

THE death has been announced from Denmark of Prof. Georges Dreyer which occurred at Söllestedgaard, Laaland, on August 17th. The event was due to a sudden heart failure; he was 61 years of age.

Georges Dreyer was the son of Captain G. H. N. Dreyer, an officer in the Danish Royal Navy; his mother was the daughter of a well-known Danish jurist, Judge W. T. Qvistgaard. He was born at Shanghai and having decided, after preliminary education, to enter the medical profession, he graduated in medicine at the University of Copenhagen and embarked upon a long course of post-graduate study. From this there emerged some fine original work, biological and chemical, on, for example, the action of light and the estimation of toxins in all of which he manifested his devotion to quantitative methods and the close application of mathematics. He was undoubtedly influenced by Madsen.



PROF. DREYER

[Photograph by Elliott & Fry

In 1907, having made real mark, he was appointed professor of pathology at Oxford with a fellowship at Lincoln College in accordance with the procedure adopted both at Oxford and Cambridge of electing university professorships to a college society. The compliment thus paid to a young foreigner was a high one, and Dreyer earned his new position by the thoroughness with which he undertook the duties. During the seven years before the war he worked strenuously for the organisation and advancement of his department, while he made contributions, resulting from original work, done frequently in collaboration with Dr. E. W. Ainley Walker, on the therapeutic effects of light rays and on many important problems of inflammation, infection, and immunity. Most of the papers were contributed to the *Journal of Pathology and Bacteriology* and were seen to redound greatly to the credit of the Oxford school.

At the outbreak of war Dreyer was appointed to the Pathological Advisory Committee of the Army Medical Services. He served in France for four years with the B.E.F., receiving first a commission in the R.A.M.C. and becoming later attached to the Royal Air Force. During his war service and immediately consequent upon it Dreyer did the original work which gained him his widest credit. Stationed at Wimereux he started researches into the diagnosis of enteric fever. The prophylactic value of antityphoid inoculation was fully recognised by the military authorities, but it was opposed in certain quarters, and Dreyer arrived through laboratory work at remarkable results both in diagnosis and treatment. In 1915, in collaboration with Dr. Ainley Walker and Dr. A. G. Gibson, he recorded in detail the results of observations made on the patients in the base hospital at Oxford. Extreme care was taken to classify all cases reported in accordance with the results of detailed bacteriological examination, particularly as regards the differentiation between *B. typhosus* and *B. paratyphosus*, although it was found that protection could be effected simultaneously against both by using a mixed vaccine. Details of the research were published in the first instance in our columns early in 1915. Records were continued in 1918 when a report was published by Prof. Dreyer, associated again with Gibson and Walker, with the assistance of Mr. Duncan Gardner, then bacteriologist to the Standards Laboratory. This record of useful work took the form of a report to the Medical Research Committee. The consecutiveness of the two documents was marred by the incidents of the war, the latter communication being originally written in 1916 when the material already completed, with other valuable data, was lost by fire. The report was held back in the hope that the details of certain of the investigations might be forthcoming later, but this unfortunately did not take place. Though the observations were worked out in a limited manner the authors were able to establish points of great practical importance in support of the production of immunisation by means of typhoid, paratyphoid A, and paratyphoid B. Dreyer determined the detailed form and time relations of the immunity curves for agglutinins following a single or a repeated dose of this triple vaccine; he showed how the time interval between the first and second inoculation influenced the effects. Immunity lasted far longer when the second dose was given at a time when the first had reached its maximum effect; this suggested the advisability of lengthening the interval between them to about three weeks. The standard suspensions prepared in Dreyer's laboratory for this work were issued for general use, making it possible to compare results in terms of agglutinin units and so to follow the course of the immunity reaction in different infections under various conditions. Over a long period of time Dreyer tested the efficacy of now one now another of the many vaccines vaunted to protect against tuberculous infection. He was himself interested in a defatted or "diaphyte" vaccine of dead tubercle bacilli and was greatly encouraged by the results of a nine years' field experiment on a herd of red Danish cows.

At the conclusion of the war Dreyer, who had been twice mentioned in despatches, was created C.B.E. and some remarkable work now came from him arising out of his association with the Royal Air Force. During the war he conducted a series of investigations on the normal vital capacity in man in relation to the size of the body. This measurement, as a guide to physical fitness in different positions and in different classes of individuals, must always be important in strenuous callings. All questions relating to the vital capacity of man acquired prominence when a measurement of that sort proved a decisive factor in the selection or exclusion of candidates for the Royal Air Force. Dreyer's investigations were published in THE LANCET in 1919 and shed new light on a difficult subject. The late Martin Flack, in the Milroy Lectures of 1921, which dealt with respiratory efficiency in relation to health and disease,

pointed out that when Dreyer applied the measurement for the vital capacity to the assessment of physical fitness he had found the older methods of estimation inadequate, as they were based on assumed relationships between age, height, and weight which could not be substantiated. Dreyer had set out the principles of his researches into vital capacity in tabular form, and with elaborate mathematical calculations had demonstrated the connexions between vital capacity, the weight of the body, the sitting height, and the chest circumference. A clear deduction from this work was, he considered, that the careful study of vital capacity in its proper relation to the body size could give guidance as to the effects to be expected from the sanatorium treatment of pulmonary tuberculosis. In 1920 he published observations bearing upon the matter in collaboration with Dr. L. S. T. Burrell, who contributed clinical notes of the cases seen in Brompton Hospital, and took the measurements required for application of formulæ, which had emerged from Dreyer's previous investigations into vital capacity. The great variations in vital capacity which must depend upon occupation and modes of life of the individuals being admitted—the athletic and outdoor subject displaying greater capacity than the sedentary one—Dreyer held that these differences in normal persons were not solely related to fundamental bodily deficiency. The careful analysis made by himself and Burrell of the signs revealed by patients of different ages and sexes yielded the practical points that in pulmonary tuberculosis there is a distinct decrease in vital capacity as compared with the normal individual; that an improvement in the clinical condition of the patient under treatment is accompanied by increased vital capacity, while the advance of the disease resulted in a decrease. Thus the vital capacity, the work suggested, could be used as a quantitative measure of benefit received and as an assistance in classification and diagnosis. Dreyer was elected F.R.S. in 1921, served on the Medical Research Council for a period, and was a fellow of the Royal Danish Academy of Letters and Science.

While such are the researches and their results with which Dreyer's name will be most closely associated, he was an endless experimenter and has left behind him incomplete much work, some of it in connexion with his first great subject of interest, the biochemical effect of light rays. But though closely occupied in the duties of his appointment, always interpreted by him in a large fashion, he found time to become an important figure in university life; he was for many years on the Hebdomadal Council, was a curator of the University Chest, and an energetic worker in the affairs of Lincoln College. As teacher and colleague he commanded the high respect and regard of those who worked with him and much well-deserved testimony to his private and social virtues has been made public. We are permitted to publish one such, which reaches us from an assistant in Dreyer's laboratory who worked with him for a long period.

"As professor in charge of the department of pathology at Oxford he was beloved; he was ever ready to help others with his optimism and his knowledge. He had a true love of research for its own sake, and no problems seemed too large or too small to engage his interest. And he approached them always with an open mind, beginning at their source and never content until by numerous and careful experiments he had established a truth that he believed could stand. As a mathematician he could not tolerate inaccurate work, and his orderly nature required neatness and cleanliness in his laboratory, and he saw that he got them. His work requires no comment from me, but his last published paper on Bovine Tuberculosis, in collaboration with Dr. R. L. Vollum, illustrates the care and the time which he gave to his experiments before he was satisfied with the findings. Georges Dreyer's kindness and thoughtfulness were unfailing; his lovable disposition and large-hearted recognition of the merits of others will live always in the memories of the many to whom he set his great example."—M. C. R.

Prof. Dreyer married in 1900 Margrete, daughter of Laurits Jörgensen, of Söllestedgaard Manor, Laaland, who survives him. He died in her Danish home.

ROBERT ALEXANDER GIBBONS, M.D., F.R.C.S. Edin., F.R.C.P. Lond.

WE regret to announce the death of Dr. Gibbons, well known as an obstetrician and gynæcologist although he held no teaching appointment in the London teaching schools, which occurred on Thursday last, August 23rd, at his house in Cadogan-place, London. His interests ranged beyond the technical side of his specialty, for his studies, especially of the causes of sterility in women, led, late in his career, into advanced pathological studies and the deliberation of eugenic questions.

Robert Alexander Gibbons was educated at University College, and completed his medical education at University College Hospital, St. George's Hospital, and the University of Edinburgh. He graduated M.B., C.M. Edin. in 1874 and later proceeded to the M.D., taking also the diploma of F.R.C.S. Edin. At Edinburgh he was house physician and house surgeon at the Royal Infirmary, and was also president of the Royal Edinburgh Medical Society. He took a course at the Rotunda Hospital, Dublin, and held several residential appointments in England, and coming to London was both house surgeon and house physician at Great Ormond-street Children's Hospital.

Gibbons was therefore unusually well-equipped when more than 40 years ago he established himself in general practice in Cadogan-place, London, in the house where he died. He soon became favourably known to a large number of patients; he made practical contributions to medical literature and became a frequent speaker at the Obstetrical Society. He was appointed physician for the diseases of women and children at the St. George's and St. James's Dispensary and at the Royal Pimlico Dispensary, and also physician to the Grosvenor Hospital for Women and Children. Various aspects of his practical experience he recorded in the articles on sterility, dyspareunia, and dysmenorrhœa, contributed to Latham and English's "System of Treatment," and other papers from his pen deserving of mention are articles on the influence of the gonococcus on the female pelvic organs contributed to the *Practitioner*, and on the causation of the onset of labour contributed to the *British Journal of Obstetrics and Gynæcology*.

Some ten years ago various aspects of eugenics, made familiar to him from his professional work, attracted his attention, and he wrote on contraception temperately and with clinical acumen. But his final interest was in an attempt to find out an explanation for the onset of labour. How closely he had thought of the matter, and how intelligently as well as assiduously he had availed himself of assistance where

his equipment failed him, may be seen in an article speculating on the rôle of the fœtus in labour, published in THE LANCET last June. Entirely as a result of personal cost and efforts he raised a small fund to be employed by a research worker on this problem and recently investigations were conducted into the question at the Courtauld Institute of Biochemistry. One who was in a position to follow this work writes to us: "It was remarkable to see the way in which Gibbons would follow up the results and his industry in reading the literature which might assist in the investigations. Despite his age and the fact that he did not enter the field of experimental pathology until late in his career he acquired a remarkable grasp of the principles of modern endocrinology as applied to sex hormones."

Gibbons, who was elected F.R.C.P. Lond. and F.C.O.G. was a Knight of Grace of the Order of St. John of Jerusalem. His courteous and handsome presence will be missed at the deliberations of the Council of Epsom College whose meetings he attended regularly.

CECIL W. HUTT, M.D. Camb., M.R.C.P. Lond.

WE regret to announce the death, on August 20th, of Dr. C. W. Hutt, medical officer of health for Holborn, in his fifty-fifth year.

Cecil William Hutt was born in 1880 and was educated at St. Paul's School, going on to Trinity College, Cambridge, with a sizarship. He took first-class honours in his tripos in 1901, and completed his medical education at St. Bartholomew's Hospital, gaining the Brackenbury medical scholarship in medicine and the Matthews Duncan prize in obstetrics. After qualifying in 1905 he held a house appointment at Bart.'s and a series of resident appointments in Manchester and Liverpool before his bent for the preventive side of medicine led him to take the D.P.H. Oxon., and accept the post of assistant M.O.H. at Warrington. From that time his promotion in the public health service was steady: deputy M.O.H. for Brighton, M.O.H. for Dudley, M.O.H. for Richmond (Surrey), and finally in 1922 the chief medical officership of a London borough, which he was holding at the time of his death. This orderly career was interrupted only by the war, when he held a temporary commission in the R.A.M.C. and served in Egypt, being invalided home in 1917 with dysentery, from the effects of which he never wholly recovered. He had wide interests and a knowledge of several languages. At Brighton he was senior school doctor, and his zest in the development of the school medical service remained with him, so that when the Education Act of 1918 greatly widened the possible range of its activities he gladly took the opportunity offered of revising Crowley's "Hygiene of School Life." It was a source of regret to him that his work in Holborn, important and interesting though it was, cut him off from this and other branches of preventive medicine, although through the child welfare centres he was able to initiate one of the first attempts to immunise London school-children against diphtheria. He was perhaps never completely at home as a municipal officer; "M.O.H.'s," he once remarked, "should be civil servants responsible only to the Government." But he held teaching appointments at Charing Cross and the Royal Institute of Public Health, at the latter institution training D.P.H. students in the routine duties of an M.O.H. In this way he came into contact with students from India and other parts of the Commonwealth and found himself happy in society of this kind. His class instruction was by no means confined to his own borough, but extended to institutions of all kinds in the metropolitan area and he took his students as far afield as Southend and Brighton.

DR. HUTT

[Photograph by E. J. Whitlock

Hutt was a ready writer and a frequent contributor to medical journals at home and abroad on public health and social matters. His book on hygiene for health visitors and social workers was one of the best of its kind—lucid in exposition and concise in information—and he collaborated with Sir William Hamer in "A Manual of Hygiene" (1925) which went far beyond its original modest aim of meeting the needs of those seeking to obtain a public health diploma. A more comprehensive work on preventive medicine, edited jointly with Dr. Hyslop Thomson, is in the press. A volume on "International Hygiene" (1927) was the result of congenial holiday visits to continental countries in search of new and fresh methods of dealing with problems which interested him. His instinctive leanings were cosmopolitan and on these tours he would as gladly interview a simple peasant as a distinguished colleague if there was knowledge to be gained. During the past year he had given much time as technical advisory officer to the subcommittee preparing a scheme for dealing with the refuse of London. He was in fact always ready to help with his store of knowledge in the solution of any difficult problem. He gave himself little time for pursuits not in some way connected with his work. He was however always a keen country rambler, and in recent years had taken up sailing with great enjoyment. As a Thameside resident the attraction of the river gripped him, and there he spent much of his summer leisure. He had evidently been working beyond his strength for some months past, but his death was unexpected outside the circle of his friends.

Dr. Hutt married, in 1909, Jennie, daughter of the late Mr. Hesse of Richmond, and leaves a widow and four grown-up children, one of whom is at present studying at his father's college at Cambridge, while another has recently qualified at St. Mary's Hospital.

THE LATE PROF. M. S. PEMBREY

A CORRESPONDENT writes: "A few details as to Pembrey's family history may form an interesting appendix to your good obituary notice in THE LANCET of August 4th. Prof. Pembrey married Cicely, daughter of the Rev. E. E. Crake, rector of Jevington, Sussex, and had ten children, five sons and five daughters. His was a very happy family life, and all five sons have been influenced in their choice of a

profession by their father's scientific outlook, two of them being medical men, one being a veterinary surgeon, the profession for which the youngest is at present studying, while another son is studying agriculture at Oxford. Others have spoken of his work, which was in directions very different from mine, but I can say that as a teacher he was inspiring and had a gift of attracting his pupils and of getting the best out of them by not only being ready to help them but by listening to their views and arguing with them when necessary. A Tory at heart he was a reformer in deed. However forcible he was at times in argument and, indeed, in objurgation, no one who knew him could take offence, first, because the kindly spirit was always obvious, and, secondly, because he generally turned out to be right. His discourse was salted with wise sayings, especially from biblical sources. His favourite quotation, 'All things work together for good,' is characteristic of the man and is to be the epitaph on his tomb."

PANEL AND CONTRACT PRACTICE

The Llanelly Dispute

THE dispute between the doctors serving the Llanelly area and the local workmen's medical committee, in which about 18,000 workers and their dependents are concerned, drags on in spite of meetings arranged to compose the differences under the chairmanship of the mayor. The committee expressed dissatisfaction that the service did not provide certain drugs and preparations, and the doctors were asked either to accept lower fees or to provide the drugs. In support it was pointed out that in 1921, when the rates of payment were agreed, there was an understanding that when wages fell in the district the rates were to be subject to revision. The committee also argued that the work required from the doctors was substantially less owing to the introduction of two specialists for eye, and ear, nose and throat, work paid out of additional contributions, and owing to medical and dental treatment provided for schoolchildren by the local authority. When the workmen's committee gave notice to the 19 doctors concerned of a reduction in payment for medical attendance from 10*d.* to 6*d.* per month for single persons, and from 1*s.* 8*d.* to 1*s.* per month for married persons with dependents, they were met by united resistance to the proposal. Last May the Insurance Acts Committee, sitting as the National Defence Trust, in view of the proposed displacement of insurance practitioners by salaried whole-timers, declared its competence to offer financial support to practitioners who sustained monetary loss in resisting the demands of the workmen's committee; and under the signature of Dr. Robert Forbes, deputy medical secretary, a statement has been issued that the resources of the B.M.A. are to be utilised to maintain the honour of the profession and the well-being of the public.

Local practitioners have now set up a public medical service providing full general practitioner treatment and some consultant service. The rates of this service are the same as existed under the old arrangements, single workmen contributing towards the service in the same degree as before—in spite of the fact that they are entitled to medical benefit under the Insurance Act; but the matter is not quite so simple as might appear, because the workmen's committee controls the local hospitals and has great influence with the local authority. The committee's reply is to start a new medical service with doctors on a whole-time salaried basis. Of the two doctors secured one is believed to have been engaged under a misapprehension, for on discovering the actual state of affairs he resigned. The two specialists engaged by the committee have tendered notices terminating their contracts. Dr. Oscar Williams, secretary to the Llanelly doctors, addressing a public meeting, is reported to have said that 70 per cent. of the workmen have adhered to their doctors. The workers who have thus accepted the public medical service in preference to the committee's scheme propose to form a separate body so that they can be represented in medical matters with delegates from various local works.

The dispute is becoming a serious matter, and unfortunately it cannot be ventilated in the House of Commons until after the recess. In the meantime it should be possible to discover how far the grievances are felt to be serious by the working people themselves. The position of any medical men who take up work for the committee can hardly be other than difficult, and the conditions will be such as to offer little attraction to really good candidates. Disputes of this kind have generally been composed in the past owing to the workmen's committee finding itself unable to obtain competent men to do the work. In the early days of the service they were more frequent owing to the pernicious amendment in the original Act allowing approved "institutions" to use financial payments made to them on behalf of insured persons with no official audit. In the present dispute it should surely be possible for the 18,000 workers and their dependents to see that they are unlikely to get adequate attendance from two or possibly three full-time outsiders when their own 19 doctors did not give them as much as they wanted. Is it not a case in which an inquiry by the Ministry of Health might clear the position?

Births, Marriages, and Deaths

BIRTHS

BRIGG.—On August 22nd, at Chipping Norton, Oxfordshire, the wife of D. A. Brigg, M.B., B.S. Lond., of a daughter.

BUTLER.—On August 14th, at a nursing-home, Cambridge, the wife of Richard Weeden Butler, F.R.C.S., of a son.

RICHARDS.—On August 20th, the wife of F. Alan Richards, B.Chir., M.B. Camb., of a son.

WARNER.—On August 21st, the wife of E. C. Warner, M.D. Lond., of a son.

WIGFIELD.—On August 23rd, the wife of Alan Wigfield, M.B., B.S. Lond., of a daughter.

MARRIAGES

PARR—HERON.—On August 23rd, at Holy Trinity Church, Brompton-road, London, Percy Crowe Parr, M.B., T.C.D., to Dorothy, second daughter of Mr. and Mrs. H. H. Heron, North Finchley.

WINGFIELD—KERR.—On August 15th, at the Parish Church, King's Norton, John Martin Wingfield, M.R.C.S., L.R.C.P., to Madge Durie, younger daughter of Mr. and Mrs. J. Durie Kerr, of King's Norton.

DEATHS

GIBBONS.—On August 23rd, Robert Alexander Gibbons, M.D. Edin., Knight of the Order of St. John of Jerusalem.

HARVEY.—On August 22nd, at Fareham, Hants, Joshua Harold Harvey, O.B.E., M.R.C.S., L.R.C.P. Lond., aged 67.

MACNAMARA.—On August 24th, after a short illness, Eric Danvers Macnamara, M.D., F.R.C.P., of Harley-street, W.

TURNER.—On August 21st, Olive Muriel Turner, M.B., M.S. Lond., the wife of Alfred Charles Turner, of the Bank of England, Liverpool.

WICKHAM.—On August 16th, at Cobbles, Sutton Scotney, George William Wickham, L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg., L.S.A.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

MEDICAL NEWS

University of London

As announced in our last issue Prof. G. Grey Turner has been appointed to the university chair of surgery tenable at the British Post-Graduate Medical School at Hammersmith. The chairs of medicine, obstetrics, and pathology have already been filled by the appointment of Prof. F. R. Fraser, Dr. James Young, and Prof. E. H. Kettle (see THE LANCET, 1934, i., 1423).

Mr. Grey Turner, who is at present professor of surgery in the University of Durham, and senior surgeon to the Royal Infirmary, Newcastle-upon-Tyne, was educated at Newcastle and graduated in medicine in 1898. He took up post-graduate study in London, Paris, and Vienna, became M.S. Durh. in 1901, and F.R.C.S. Eng. in 1903, and was surgical registrar at the Royal Infirmary from 1900 until 1906, when he joined the honorary staff. In these capacities and as university lecturer in surgery he showed great interest in teaching. During the late war he served on the surgical side of 1st Northern General Hospital in Newcastle and with a general hospital in Mesopotamia, where he was acting consulting surgeon at Amara; later he worked as consulting surgeon for chest surgery in the Northern Command, and went on a War Office mission to the United States. He has also visited America on three other occasions; in 1931 he delivered the John B. Murphy oration in Philadelphia, and in 1932 the Bigelow medal was conferred on him after an address in Boston, U.S.A. Likewise he has visited the principal surgical clinics on the continent. In 1927 he succeeded to the chair of surgery at Durham, and two years later he was invited to take charge of a surgical unit at St. Bartholomew's Hospital for a short period, being made a perpetual student of the medical college. At the Royal College of Surgeons of England he is a member of the council and has been Hunterian professor. He has also delivered the annual oration of the Medical Society of London, in 1929. Prof. Grey Turner is editor of a new edition of "Modern Operative Surgery," which is now in the press, and is a contributor to Choyce's "System of Surgery." He has contributed papers to the medical press dealing with a large variety of surgical subjects, including many on cancer. He is especially interested in the history of surgery.

Society of Apothecaries of London

Sir George Buchanan, C.B., F.R.C.P., has been appointed Master of the Society for 1934–35. Sir William Willcox, K.C.I.E., F.R.C.P., and Dr. J. S. Fairbairn, F.R.C.P., have been reappointed senior and junior wardens respectively.

At recent examinations the following candidates were successful:—

Surgery.—F. A. Frank, Univ. of Liverp.; F. M. Kerry, Univ. of Durham; and J. T. Moohalaparackel, Queen's Univ., Belf.

Medicine.—S. Adams, Charing Cross Hosp.; T. D. R. Aubrey, Univ. of Oxf. and Bristol; M. T. Curran, Univ. of Leeds; A. H. El. S. El Mahallawy, Royal Colleges, Edin.; R. C. H. Ensor, Univ. of Belf. and Guy's Hosp.; F. A. Frank, Univ. of Liverp.; W. H. Jervis, Univ. of Manch.; C. W. O'Donoghue, London Hosp.; J. F. Owen, Univ. of Camb. and St. Mary's Hosp.; H. Paroulakis, Univ. of Innsbruck and St. Mary's Hosp.; and D. Walton, Univ. of Manch.

Forensic Medicine.—F. G. S. Alderson, Univ. of Leeds; F. A. Frank, Univ. of Liverp.; and W. H. Jervis, Univ. of Manch.

Midwifery.—J. A. Amor, St. Mary's Hosp.; N. A. Bicchieri, St. George's Hosp.; D. P. Hickey, Univ. of Manch.; F. M. Kerry, Univ. of Durham; and K. P. Pauli, Univ. of Bristol.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery:—

F. G. S. Alderson, M. T. Curran, J. T. Moohalaparackel, C. W. O'Donoghue, J. F. Owen, and H. Paroulakis.

An Exhibition of Inventions

The tenth international exhibition of inventions, which has been organised by the Institute of Patentees, will take place in the Central Hall, Westminster, London, from Oct. 3rd to 13th. It will be open from 11–10 daily.

Chartered Society of Massage and Medical Gymnastics

The annual congress of this society will be held at Bedford College for Women, Regent's Park, London, N.W., from Sept. 24th to 28th. The first lecture will be delivered by Prof. John Fraser on vascular disturbances of the extremities. The founder's lecture will be given by Sir Humphry Rolleston who will speak on occupational diseases of those in attendance on the sick. The meetings are open to all medical practitioners and further information may be had from the secretary of the society, Tavistock House (North), Tavistock-square, London, W.C.1.

Prof. Bernhard Zondek has accepted an invitation to become director of the obstetrical and gynæcological unit of the Hadassan-Rothschild Hospital in Jerusalem. Dr. Zondek was formerly professor of obstetrics and gynæcology in the University of Berlin, and has made important contributions to the study of sex hormones.

National Smoke Abatement Society

The annual conference of this society will be held at Glasgow from Sept. 27th to 29th under the presidency of Dr. H. A. Des Voeux. The speakers will include Dr. J. R. Currie, Dr. J. S. Owens, and Dr. J. Johnstone Jervis. Particulars may be had from the general secretary at 36, King-street, Manchester 2.

Photographic Documentation in Science

The second congress of the Association pour la Documentation Photographique et Cinématographique dans les Sciences will be devoted to the work of its physical and chemical sections, including surgery. It will take place at the Musée Pedagogique de l'Etat, 29, Rue d'Ulm, Paris, from Oct. 4th–12th. The secretary of the congress is Dr. Claoué, 39, rue Scheffer, Paris XVI.

Medical Officers of Schools Association

A meeting of this association will be held at the Town Hall, Grove-road, Eastbourne, on Saturday, Sept. 15th, at 10 A.M., when Dr. J. Alison Glover and Dr. Fred Griffith will read a paper on acute streptococcal throat infections. The secretary of the association may be addressed at 11, Chandos-street, London, W.1.

Middlesex Hospital Medical School

On Oct. 1st, at 3 P.M., the hundredth winter session of this school will be opened, when Dr. Henry MacCormac delivers an address entitled Our Profession. The prizes gained during the previous year will afterwards be distributed by Sir Farquhar Buzzard. The address and prize-giving will take place in the Queen's Hall, Langham-place. On the same evening the annual dinner will be held at the Savoy Hotel.

Memorial to Dr. Stenhouse Williams

On Oct. 13th Sir Hilton Young, the Minister of Health, will open a library, which has been established at the National Institute for Research in Dairying, at Shinfield, near Reading, as a memorial to Prof. Stenhouse Williams, the late director.

Blindness in Buckinghamshire

The National Institute for the Blind announces that during the past two years there has not been one blind child under 5 years of age in the whole of Buckinghamshire. Out of a total blind population of 310 in the county, exactly 200 are over 50 years of age, and of these 111 are over 70 years of age.

Enlargement of Porth Hospital

A new ward of this Glamorganshire hospital was recently opened by Sir W. J. Thomas and Lady Thomas. The ward, which has cost £7000, is named after the three children of the openers in recognition of the benefactions of the Thomas family to the institution.

Medical Society of London

The programme for the first half of the 162nd session of this society opens with the annual general meeting at 8 P.M. on Monday, Oct. 8th, after which, at 8.30 P.M., Lord Horder will give a presidential address on medicine and morals. Subjects for the Monday evening discussions are as follows: Oct 22nd, the anæmias and their treatment, to be introduced by Dr. Leslie Witts; Nov. 26th, the value of accessory methods in the diagnosis of intracranial tumours and allied conditions (Mr. Hugh Cairns); and Dec. 10th, the future of diagnostic radiology (Dr. H. Graham Hodgson). On Nov. 12th there will be a clinical meeting. The Lettsomian lectures for 1935 will be delivered by Mr. J. E. H. Roberts, and the annual oration by Sir William Willcox.

A Children's Ward at Ilfracombe

The Ilfracombe Tyrrell cottage hospital has been enlarged by the addition, at a cost of £2500, of a children's ward containing ten cots. There are also three wards for paying patients.

Donations and Bequests

Among other bequests, the late Miss Constance Leete-Absolon, of East Sheen, left £2000 to the Royal Hospital, Richmond, part of which is for the endowment of a bed, and £1000 to St. Mary's Children's Hospital, Paddington Green, for a cot to be called the "Leete-Absolon Cot."—The late Mrs. Constance Blyth Watson, of Lindfield, Sussex, widow of Innes Watson, barrister-at-law, left £6000 to Dr. William F. Simpson "in recognition of his great kindness to my late husband during his long illness and to myself during that strenuous and anxious time."

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY, Sept. 3rd, to SATURDAY, Sept. 8th.—INFANTS HOSPITAL, Vincent-square, S.W. Course in Infants' Diseases. All-day.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Lecture-Demonstration by Dr. A. E. Clark-Kennedy on Pleural Pain, at 2.30 P.M., on Tuesday, Sept. 4th.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W. Lantern-demonstration on Some Practical Points in the Diagnosis and Treatment of Urological Cases, by Mr. H. P. Winsbury-White, at 3 P.M., on Saturday, Sept. 8th.—PANEL OF TEACHERS. Individual clinics in various branches of medicine and surgery are available daily.—Courses of instruction, clinics, &c., arranged by the Fellowship are open only to members and associates.

Appointments

FIGDOR, JULIUS, L.D.S., has been appointed Dental Surgeon to the City of London Maternity Hospital.

MACDONALD, C. R., M.B., F.R.C.S. Edin., Assistant Registrar and Tutor at the Jessop Hospital for Women, Sheffield.

SIMMONDS, F. A. H., M.B. Camb., D.P.H., Tuberculosis Medical Officer under the Middlesex County Council.

STEWART, Prof. M. J., M.D. Glasg., F.R.C.P. Lond., Hon. Pathologist to the Leeds Public Dispensary and Hospital.

Royal Liverpool Babies' Hospital, Woolton.—The following appointments of honorary physicians are announced:—GAISFORD, W. F., M.D. Lond., M.R.C.P. Lond.; and FORSHALL, ISABELLA, M.B. Lond., F.R.C.S. Edin.

Royal Sussex County Hospital, Brighton.—The following appointments are announced:—
CASTLEDEN, L. I. M., M.D. Lond.;
PRICE, R. KEMBALL, M.D. Lond.; and
WINDLE, R. W., M.B. Camb., Honorary Medical Registrars.
MACKENZIE, K. F., M.B. Dub., F.R.C.S. Irel.;
WILLIAMS, J. C. F. LLOYD, M.B. Camb., F.R.C.S. Eng.; and
WOOD, W. R. FORRESTER, M.B. Camb., F.R.C.S. Eng., Honorary Surgical Registrars.
DRYNAN, A. E., M.B. Edin., Honorary Clinical Assistant to the Dermatological Department.

Certifying Surgeons under the Factory and Workshop Acts: SCHOLEFIELD, B. G., M.D., M.Ch. Oxon., F.R.C.S. Eng. (Great Malvern, Hay, Hereford, Ledbury and Leominster Districts); POOLE, J. C. C., B.Chir., M.B. Camb. (Crowborough District of the County of Sussex); and NEWMAN, T. B., L.R.C.P.I., and L.M., L.R.C.S.I. (Mullion District of the County of Cornwall).

Vacancies

For further information refer to the advertisement columns

All Saints' Hospital for Genito-Urinary Disease, St. George's-road, S.E.—Res. H.S. At rate of £100.
Birmingham and Midland Eye Hospital.—Res. Surg. O. At rate of £200.
Birmingham Ear and Throat Hospital.—Third H.S. At rate of £150.
Bolingbroke Hospital, Wandsworth Common, S.W.—Res. M.O. £200.
Brighton, Royal Sussex County Hospital.—Cas. H.S. £120.
Brighton Sanatorium and Infectious Disease Hospital.—Jun. Res. M.O. At rate of £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Central London, Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Assts. in Out-Patient Dept.
Cobham, Surrey, Schiff Home of Recovery.—Res. Surg. O. At rate of £200.
Coventry and Warwickshire Hospital.—Res. Cas. O. £125.
Deal, Walmer and District War Memorial Victoria Hospital.—Hon. Physician.
Derby, Derbyshire Royal Infirmary.—Cas. O. and Orthopædic H.S. Also H.S. for General Surgery, &c. Each £150.
Dewsbury and District General Infirmary.—Hon. Orthopædic Visiting Surgeon. Also H.S. £150.
Doncaster Royal Infirmary.—H.S. £175.
Doncaster Royal Infirmary and Dispensary.—Two Hon. Asst. Surgeons.
East Ham Memorial Hospital, Shrewsbury-road, E.—H.S. and Cas. O. At rate of £120.
Egypt, Ministry of Education.—M.O. for Girls' Schools. £E.40.
Exeter, Royal Devon and Exeter Hospital.—H.S., and H.S. to Ear, Nose, and Throat Dept. Each at rate of £150.
Great Yarmouth General Hospital.—H.S. £140.
Harrogate and District General Hospital.—H.P. and Cas. O. Each at rate of £150.
Hove General Hospital.—Res. M.O. At rate of £150.
Hull Royal Infirmary.—Hon. Asst. Physician.
Leamington Spa, Warneford General Hospital.—H.S. for Cas. and Spec. Depts. £150.
Leicester Royal Infirmary.—Two H.S.'s, Cas. O., H.P., and Two Jun. Res. Anæsthetists. Each £125. Also Jun. Cas. O. £100.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Manchester, Abergele Sanatorium.—Second Res. Asst. M.O. £350.
Manchester, Ancoats Hospital.—Res. M.O. At rate of £150. H.P. At rate of £100. Also Med. Reg. £50.
Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.
Manchester Royal Children's Hospital.—Two Asst. M.O.'s for Out-patient Dept. Each at rate of £150.
Manchester, St. Mary's Hospitals.—H.S.'s Each at rate of £50.
Margate and District General Hospital.—Res. M.O. £150.
Market Drayton, Salop, Cheshire Joint Sanatorium.—Res. Asst. M.O. £350.
Middlesbrough, North Riding Infirmary.—Hon. Surgeon.
Miller General Hospital, Greenwich-road, S.E.—H.P. and H.S. Each at rate of £100.
Mothers' Hospital, Salvation Army, Lower Clapton-road, E.—Jun. Res. M.O. At rate of £80.
Northampton General Hospital.—Four Res. M.O.'s. Each £150. Also Sen. Res. M.O. £250.
North Middlesex County Hospital.—Jun. Res. Asst. M.O. At rate of £250.
Norwich, Norfolk and Norwich Hospital.—H.S. to Spec. Depts. £120.
Preston, Biddulph Grange Orthopædic Hospital.—Jun. H.S. At rate of £150.
Princess Beatrice Hospital, Richmond-road, Earl's Court, S.W.—Res. M.O. At rate of £150. Also H.P. and Cas. O., H.S. and Cas. O. Each at rate of £110.
Princess Elizabeth of York Hospital for Children, Shadwell, E.—H.P. and Cas. O. Each at rate of £125.
Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. O. Each at rate of £100.
Radium Institute, Riding House-street, W.—H.S. At rate of £150.
Richmond, Surrey, Royal Hospital.—Jun. H.S. At rate of £100.
Royal London Ophthalmic Hospital, City-road, E.C.—Sen. Res. O. At rate of £150.
Royal National Orthopædic Hospital, 234, Great Portland-street, W.—H.S. At rate of £150.
Royal Northern Hospital, Holloway, N.—H.S. Also Obstetric H.S. Each at rate of £70.
St. Mary's Hospital, W. (Venereal Disease Dept.).—Part-time Asst. Director. £350.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—H.S. £75.
Salford Royal Hospital.—Hon. Asst. S. Also Two H.S.'s., and Cas. H.S. Each at rate of £125.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100.
Scarborough Hospital and Dispensary.—H.S. At rate of £175.
Sheffield Children's Hospital.—H.P. and H.S. Each at rate of £100.
Sheffield, Jessop Hospital for Women.—Res. M.O. At rate of £150.
Sheffield Radium Centre.—Asst. M.O. £300.
Shrewsbury, Royal Salop Infirmary.—Res. H.P. At rate of £160.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Asst. H.P. £125.
Watford and District Peace Memorial Hospital.—H.S. At rate of £150.
West Bromwich and District General Hospital.—H.S., H.P., and Cas. O. Each at rate of £200.
West London Hospital, Hammersmith-road, W.—H.P. Also 2 H.S.'s to Special Depts. Each at rate of £100.
Wrexham and East Denbighshire War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Holt, Norfolk.

Medical Referee under the Workmen's Compensation Act, 1925, for the Aberdeen, Peterhead and Stonehaven Sheriff Court Districts. Applications should be addressed, the Private Secretary, Scottish Office, Whitehall, London, S.W.1, before Sept. 12th.

NOTES, COMMENTS, AND ABSTRACTS

A CHINESE-RUN HOSPITAL

SURG.-COMMANDER J. CUSSEN, R.N., sends us (with permission of the Foreign Office and the Admiralty) an account of the Central Hospital in Nanking which was opened last July on the Chungshan-road overlooking the aerodrome. Most of the hospitals in Yang-tse outposts are under American or British supervision, and the operations are done by foreign surgeons. In this hospital the foreigner would be entirely under the care and treatment of Chinese, there being only one foreign doctor out of a staff of 40. Commander Cussen was shown over the hospital by Dr. J. Heng Liu, the medical director. The framework consists of a central tower, containing the only lift in Nanking, with two long wings each three stories high. The out-patient departments are on the ground floor, classification being much the same as in any London hospital. The first floor contains the beds for poorer patients, who pay 60 cents per diem, the wards being particularly large and airy; "the wall seemed to be all windows," Commander Cussen remarks. Walls and floors are of glazed cement, the beds well spaced, bedsteads painted white, and no sign of spitting on the floor. Above are the first-class patients, who pay 90 cents per diem, which includes medical and nursing attention. There are in all 350 beds, of which 280 were occupied at the time of Commander Cussen's visit. February is recognised as one of the healthiest months of the year in China and the number suggests how well the hospital is patronised even during the slack period. The total cost works out at about 2000 dollars per diem, paid by grant from the central government as the hospital is State-owned. There was, says Commander Cussen, a great air of bustle and slickness about the whole place; it was a weekday on which he inspected the hospital, through all of which he moved quite freely, being much impressed by the orderly routine and daily work of a big organisation. At present the hospital has no medical school, although the nurses, both male and female, are trained there as well as midwives. In the near future it is hoped to have classes and teaching staff for medical students. Most of the electrical fittings and some of the instruments were of German origin, some from America and Vienna; Commander Cussen could find no instrument or object which had been purchased in England. Every appliance likely to help physician or surgeon in his work was there.

The public health department, situated behind the hospital, is a building rather like the hospital in miniature. It might fairly be called the child of Dr. Heng Liu, who is himself vice-minister of public health in the central government. Commander Cussen found there one of the most complete and up-to-date laboratories he had seen. Vaccines are made in the department for protection against cholera, typhoid, and small-pox. There is a room allotted to malaria research, with many types of anopheles in bottles, and charts illustrating the cycle of the disease. Schistosomiasis has a room to itself. The rooms used for preparing health charts and lantern slides in schools interested him especially; models illustrating rashes of scarlet fever, measles, and small-pox were being made. He watched a youth with a plaster cast of a face in one hand and a wire heated over a Bunsen burner in the other, using melted wax to depict small-pox in the vesicular stage—an Epstein at a salary of 80 cents a month. The original models were purchased in Vienna and copies are being made at almost nominal cost. Statistics of tropical diseases are being sent to this department from the country districts, and wall-maps with coloured flags show the prevalence of disease in China. Commander Cussen was impressed by the Stork machine, a ready-reckoner with hand and dial representing months, weeks, and days; by a twist of the handle the expectant mother is told when to date the probable date of labour. Wassermann and Kahn tests are carried out in the laboratory which makes its own antigen for the purpose. Students in the laboratory were preparing mercurochrome in quantity. Throughout there was the appearance of smartness that accompanies recently purchased first-class apparatus, but although, like the hospital, it is still waiting to be proved by time, Commander Cussen was satisfied himself that both had a distinguished future before them.

CANADA AND THE EMPIRE

CANADA has been pleased that Ottawa was selected for the great conference called together with the object of welding the commerical and industrial interests of the Empire, and the *British Trade Review* for July, 1934, in a large and fully illustrated issue, does justice to the industry and perseverance of the country. The letterpress has been supplied by representative and often very important writers, and the general position of the commercial relations between this country and Canada is excellently set out. The exhibition of Canadian products recently held in St. Paul's Churchyard, E.C., was a proof of material progress, and on many of the stalls were to be seen domestic appliances, articles of clothing, and foodstuffs with direct interest to doctors and others in charge of health agencies or health-promoting industries. Canada is now Britain's chief supplier of some of these articles, and the Exhibition proved that coöperative methods within the Empire are on the increase in a practical and valuable manner.

TUBERCULOSIS AT BREST

SOME three years ago we quoted [1] from a paper on tuberculosis at Brest, which ended on a note of confidence that there was to be less in future. But there has since appeared in the same journal another paper,[2] by J. Querangel des Essarts, not quite so encouraging. The situation is undoubtedly remarkable. Whereas the general death-rate of the French navy from tuberculosis is 5·3 per 1000, it is 9·6 in the Brest division. Likewise in the garrison of Brest it is 8·5, or double the general rate of the French army; in the dockyard it is 10·5, and in the town 5·28 (7·9 in the worst districts). The town has 70,000 inhabitants, and is somewhat isolated in its position at the extreme end of the Department Finistère, its main industry being the navy and the dockyard. Some people think Bretons specially liable to consumption, but they give no indication of this susceptibility when they are settled in French colonies abroad. The trouble at Brest is that there is great overcrowding and the families are large. Among the families of invalids visited by des Essarts, of those numbering from 5 to 12 persons, half were living in one room. The surroundings ashore are thought more dangerous than in ships, and it is proposed to reduce the liability to tuberculosis by improving conditions of life, by giving help to invalids to get treatment, by segregating them from their families (who will then themselves need assistance), and by B C G inoculation for their children.

ACCIDENTS IN PNEUMOTHORAX TREATMENT

Dr. E. Frommel and Dr. M. Demole have endeavoured to calculate the frequency of accidents during the induction of a pneumothorax or a subsequent refill (Rev. de la Tuberc., 1934, No. 1). In order to secure adequate data they addressed a questionnaire to the leading chest specialists and sanatoriums in Switzerland, and obtained information about more than a quarter of a million injections. Among these there were 63 accidents—0·28 per 1000—of which only 5 were fatal. About a quarter occurred at the first injection, the remaining three-quarters being associated with a refill; but as, on the average, the patient has some 50 refills in the course of four to five years' treatment and only one first injection, the comparative danger

[1] THE LANCET, 1931, i., 1412.
[2] Arch. de Méd. Navales, 1933, cxxiii., 604.

of this injection is great (17 times greater than for a refill). In 52 per cent. of cases the accidents happened before any gas had been introduced into the chest. In another 19 per cent. it happened after the injection of gas had proceeded uneventfully and the needle had been withdrawn. A classification of the accidents according to whether the instrument used was pointed or blunt did not discriminate in favour of one or the other. In many of the cases the symptoms lasted only a few minutes. In some, however, the duration was a few hours; and they included a hemiplegia lasting a month and an amaurosis lasting till the patient's death from generalised tuberculosis 15 months later. Less than a third were unassociated with any local nervous phenomenon, and more than two-thirds were characterised by paresis, monoplegia, hemiplegia, aphasia, with or without epileptiform fits or amaurosis. In the fatal cases death was almost instantaneous.

The rarity of fatal accidents in this collective study is in marked contrast to their incidence in the early days of artificial pneumothorax, and is a tribute to those who, in the interval, have laboured to make this treatment as safe as possible.

ATTRACTIONS OF THE DEAD SEA

THE merits of the Dead Sea region as a health resort were glowingly described in a recent lecture to the Royal Society of Arts delivered by Major T. G. Tulloch, managing director of Palestine Potash, Ltd. "The climate," he said, "has been ascertained in practice to be very beneficial for the treatment of ailments such as rheumatism, kidney, and bronchial troubles, while those with weak hearts also obtain relief." The healthiness of the northern shores of the sea and its neighbourhood is, he suggested, due to a combination of causes, one of which is the great depth below sea level, the Dead Sea being 1300 feet below the Mediterranean; there is 6 per cent. more oxygen in the air than at any other open place in the world. The water itself is not only charged to the extent of 25 per cent. with salts having beneficial medical properties, but is also radio-active. The effect of a bathe, he said, is extraordinarily rejuvenating. "It is a remarkable thing that a child will arrive pale and anæmic-looking, but after a few days at the Dead Sea it will regain its health and rosy cheeks and be full of play and energy."

Vegetables, too, grow in an amazing manner. "We won a prize," said Major Tulloch, "at the Jerusalem vegetable show with broad beans which were nearly 24 inches long. Radishes are as large as 1 foot long and 9 inches round, and very well flavoured. We planted radish seeds one day at six o'clock in the evening, and the next day at the same hour they were showing up! The Jericho orange is far superior to the Jaffa, and one I measured was 16 inches round and weighed 1 lb. 14 oz. One very curious thing," he added, "—it is probably a mere coincidence—is that during the past year practically all the children born to our workers there have been boys, and there is therefore great competition among the Arabs to obtain employment with us, as they only count boys."

DERMATITIS DUE TO LINSEED

"W." writes: In your issue of August 18th Dr. Robert Aitken describes a case of dermatitis due to linseed, and suggests that it is the dust from the seeds, not the oil, which was the irritant. In the "Commercial Products of India," the late Sir George Watt mentioned the frequent admixture of linseed with mustard-oil seed, which occurs the more readily as the Indian native does not require a drying oil, and the admixture does not reduce the value of the product to him however much it may do so for the foreign market. Linseed as received from abroad is admittedly often mixed with various other seeds, stones, and dust; to produce the better class oil the linseed, before reaching the milling room, is passed through a cleaning machine in which the foreign material is extracted as far as possible.

THE DIONNE QUINTUPLETS

WE have received from the *Toronto Daily Star* photographs of quintuplets born two months ago in Callander. Our correspondent informs us that all the babies are progressing normally, and the pictures supply evidence for the statement. We gather from voluminous letterpress that what the babies can do and what is being done for them are subjects of interest to a wide public. The father and grandfather have made preparations to sell picture postcards of the babies from a booth erected in front of their home. But we are glad to learn that precautions have been taken against exploitation schemes which might endanger the lives of the quintuplets.

The rarity of the event is indicated from the figures supplied some years ago by Arturo GUZZONI, which have been accepted as reliable. GUZZONI's figures are: twins, 1 in 87; triplets, 1 in 7103; quadruplets, 1 in 757,000. He does not mention quintuplets. Instances of 5 and even of 6 at a birth have been recorded, but many of the stories have not obtained proper substantiation. It is accepted, however, that about 30 authentic cases of quintuplets are on record, though the fate of the babies is not anywhere given in detail. Multiple births are, as is well known, characteristic of certain families, but apart from that little is known of their œcology. From a remarkable demographic and ethnic study of twin pregnancy by Sir Kedarnath Das, professor of obstetrics in Calcutta, in the April number of the *Journal of Obstetrics and Gynæcology*, we learn however that while climate does not seem to influence the frequency of twins, the proportion is definitely higher in white than coloured races in the United States of America (1 : 88 and 1 : 67). The average frequency in his vast collection of 189 million births is 1 : 90.

AN EASY JOURNEY

Dr. A. LANDALE CLARK writes: "Last week I was faced with the problem of transporting a patient, aged 20 years, from London to Zurich. The patient was in a very weak condition, having had one thigh amputated for extensive osteomyelitis. It was decided that the only way in which the journey could be accomplished was by air. In coöperation with the parents I approached Imperial Airways regarding the journey and the forward cabin in one of their newest type of four-engined aircraft was reserved. This cabin ordinarily accommodates ten passengers; by removing the backs of four seats it was possible to erect a wooden bed, complete with Dunlo-pillo mattress, 4 in. deep (supplied by John Bell and Croyden). The bed was 6 ft. long and about 3 ft. wide, and was fitted in such a position that the patient, in a reclining attitude, had perfect vision through the windows. In addition to the patient, in the cabin were his mother, a male nurse, and myself, and we could with comfort have had two other passengers as well.

"The journey started at 7 A.M. from a nursing-home in the west end of London, by motor ambulance to Croydon, where the patient was lifted direct from the ambulance bed to that in the aeroplane, it being perfectly easy to run the ambulance alongside the plane. The actual air journey started at 8.5 A.M., and we reached Zurich at 2.15 P.M., having had half an hour's stop at Paris and a quarter of an hour at Basle. The weather was, on the whole, good after some rain as far as the Channel. At Zurich an ambulance was awaiting the aeroplane and again it was possible to bring it alongside the plane. The patient was in bed in the clinic there at 3.15 P.M. precisely.

"The whole journey did not cause any unpleasant symptoms whatsoever, the only drug administered during the whole period of transit was gr. ¼ morphia, given half an hour before arrival at Zurich. The patient ate a good lunch on board and his temperature that evening was only one degree higher than on several previous evenings in London. I saw him the next day; the temperature was practically normal,

and there were no signs nor symptoms to show that he had been subjected to undue strain or fatigue.

"The total expense of the journey, I understand, was between £70 and £80. Its ease and comfort were mainly due to the interest and trouble taken by members of the staff of Imperial Airways, in particular the Special Charter Dept. I was shown a smaller machine, fitted, nevertheless, with three engines, which contained a full-length bed besides accommodation for two other people; this can be hired as an aerial ambulance at the rate of 1s. 6d. per mile."

Dr. Clark hopes that his experience of air transport will be of service to any of his colleagues faced with a similar problem.

NEW PREPARATIONS

AMYTAL, SODIUM AMYTAL, AND EXTRALIN.—Eli Lilly and Company (2, 3, 4, Dean-street, London, W.1) have placed these three preparations on the market. Amytal, iso-amyl-ethyl barbituric acid, is supplied in tablet form. The drug is given in solution with water or milk and is recommended to the doctor where the judicious use of barbiturate is indicated. Sodium amytal, sodium iso-amyl-ethyl barbiturate, is suggested for early use in the pre-operative preparation of surgical cases, and American experiences appear to justify the claims of the manufacturers for its value. They give also references respecting the use of these pulvules in obstetric practice and in certain spasmodic conditions. Both these preparations are accompanied by wise warnings on the necessity of using the barbiturates only under medical direction. Extralin is a liver preparation designed for the oral treatment of pernicious anæmia. The liver extract is prepared so that 3 to 4 pulvules three times daily should constitute an adequate dose for most cases, though heavier dosage can be employed where the physician considers it advisable.

NEO-MONSOL.—Preparations made by Monsol Ltd. (now of Vincent House, Vincent-square, London, S.W.) were described in THE LANCET several years ago (1927, i., 742). Containing the germicidal properties of phenol, the monsol preparations are free from toxic or irritating effects, but in their original form the æsthetic qualities of the preparations were not always commendable. Since their introduction improvements have been made, and neo-monsol, in the form of a liquid germicide, a gel and an ointment, should be acceptable. The new preparations have an increased germicidal efficiency as compared with the original Monsol—an efficiency which is maintained in the presence of organic matter—are non-irritant and non-staining. The manufacturers supply clear information on the various dilutions appropriate to different purposes, personal or medicinal.

PED-DRI-TONE (The Ped-dri-tone Co., 14, Auckland-hill, West Norwood, London, S.E.27).—This firm supplies preparations designed to render leather goods, especially footwear, waterproof. They are not varnishes but impregnating fluids. They are made in two qualities, non-polishable for soles of footwear, and polishable for the uppers of shoes and boots or for application to any leather surface requiring the treatment. The fluids are easy of application and can be obtained in various colours. As the preparations are cheap, while the defects in footgear which it is designed to improve are common and vexatious, they seem to deserve trial.

Z. B. T. BABY POWDER (Crystal Products Co., Ltd., 32–6, City-road, London, E.C.) is an olive oil preparation for which special advantages are claimed through the addition of the oil to talcum. The smoothness of the preparation should be especially comforting when applied to sores or abraded surfaces.

MEDICINAL GLUCOSE (ANHYDROUS) (Boots Pure Drug Co., Ltd.).—This is a white crystalline powder which conforms to the requirements of the B.P. for dextrose. The preparation is supplied in tins of handy shape and size, accompanied by a pamphlet which sets out the advantages of glucose as a therapeutic agent with the various particular indications for its use. It can be given by the mouth, and a pleasant prescription is supplied for making glucose lemonade. It can be administered intravenously when rapid action is required, as in the marasmus of children or severe conditions of vomiting, and in certain circumstances rectal administration is valuable.

UNCLE JOE'S NONSENSE[1]

A COMPOST of anecdotes, comic essays in the form of letters, parodies, and quotations from various sources, with black and white illustrations, some of which are quite clever, has been written under this title by a very serious man, or, at any rate, by one who has done very serious work. He describes his production as random ravings, and dedicates it to "my nieces and nephews in New Zealand and to my friends of the Ceramic Society"; the work entirely defeats review but forms a good example of unbending on the part of a man of science. For although the author only describes himself on the title page of his medley of fun and philosophy as hon. secretary of the Ceramic Society, which body is responsible for the publication, he is a learned doctor of science and Fellow of the Royal Society, to whom we owe treatises on chemical statics and dynamics, on inorganic chemistry, and on higher mathematics. Queen Victoria is popularly reported, on reading "Alice in Wonderland," to have asked to have the author's previous works sent to her, and to have received Mr. Dodgson's treatises on plane trigonometry and algebra. He or she who is amused by Mr. Mellor's latest book and who makes a similar request for his earlier productions will be similarly astonished.

NIPS OF CHAMPAGNE

"WHEN," writes a naval nurse through the medium of a doctor, "are we to have champagne for the sick-room in 1 or 2 oz. bottles, properly stoppered? The wine is invaluable in certain cases. We have, for the public, cocktails in small sealed bottles, and other stimulants can be obtained in small doses; why not champagne? Who in charge of a patient does not dread, when this wine is ordered by the doctor, the hurried rush that follows to the wine merchant's or the begging of a bottle from a friend? Cannot some enterprising firm supply to the chemists champagne in an accessible form, procurable upon a doctor's written order?"

*** No doubt the prescription of champagne in households where the wine has to be procured hurriedly and opened at once is troublesome to those in attendance, but Naval Nurse's suggestion of the 1 or 2 oz. bottle is not feasible—at least, we doubt any merchant finding it a good proposition. But there are several appliances that can be used as stoppers to the opened bottle, allowing measured doses to be drawn off.—ED. L.

THE Medical Supply Association Limited is opening early this month commodious new showrooms at 95, Wimpole-street, nearly opposite to the house of the Royal Society of Medicine.

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[1] Uncle Joe's Nonsense for Young and Old Children. J. W. Mellor. London, New York and Toronto: Longmans, Green and Co., Ltd. 1934. Pp. 231. 12s. 6d.

RESEARCH IN ENCEPHALITIS.—The foundation of the advancement of encephalitis research, at the University of Berne, offers prizes to workers in that field. Particulars will be found in our advertisement columns.